MULE DEER

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2012 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2012 - 5/31/2013

HERD: MD319 - POWDER RIVER

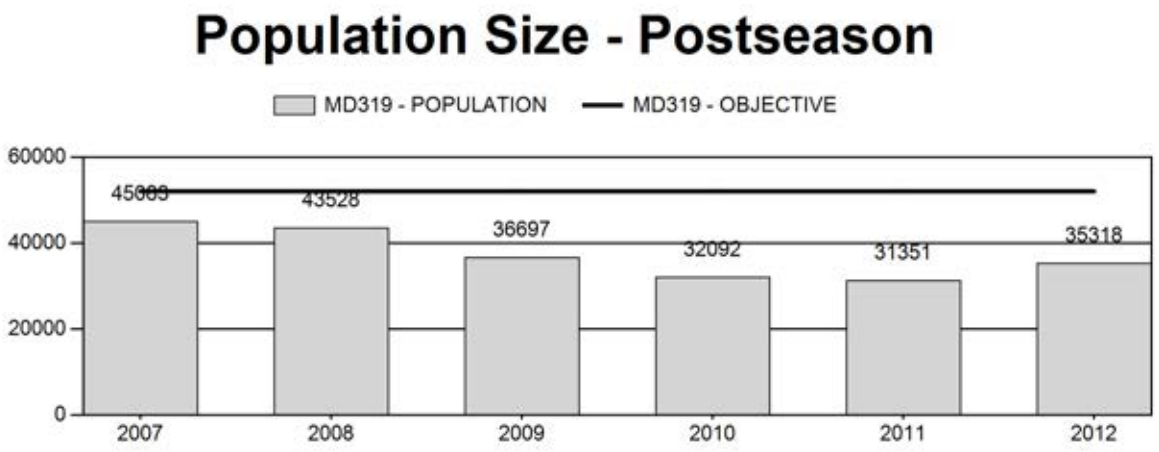
HUNT AREAS: 17-18, 23, 26
PREPARED BY: ERIKA PECKHAM

	2007 - 2011 Average	2012	2013 Proposed
Population:	37,750	35,318	32,587
Harvest:	3,182	2,541	2,700
Hunters:	4,645	3,602	3,850
Hunter Success:	69%	71%	70%
Active Licenses:	4,848	3,725	3,900
Active License Percent:	66%	68%	69%
Recreation Days:	18,629	14,039	15,000
Days Per Animal:	5.9	5.5	5.6
Males per 100 Females	37	41	
Juveniles per 100 Females	64	75	

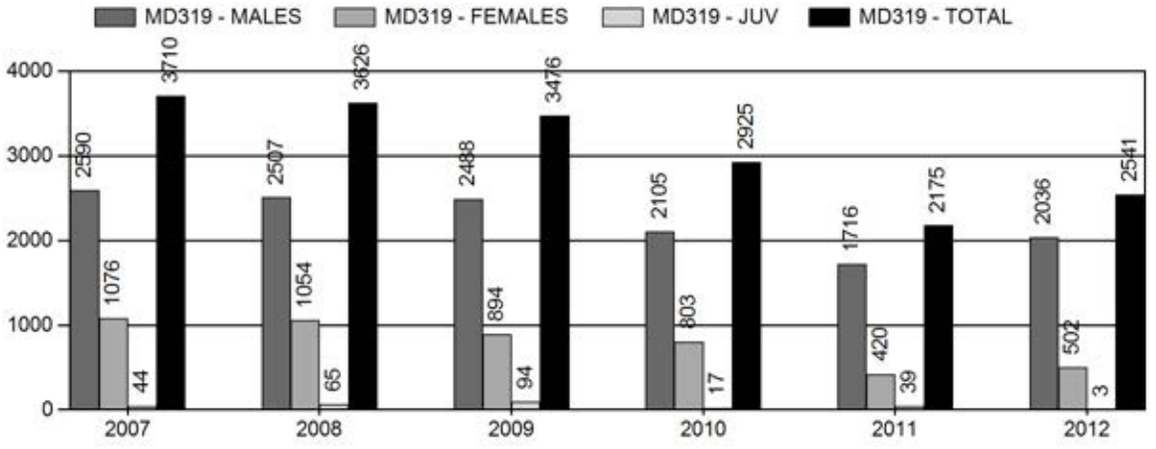
Population Objective:	52,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-32.1%
Number of years population has been + or - objective in recent trend:	16
Model Date:	05/14/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

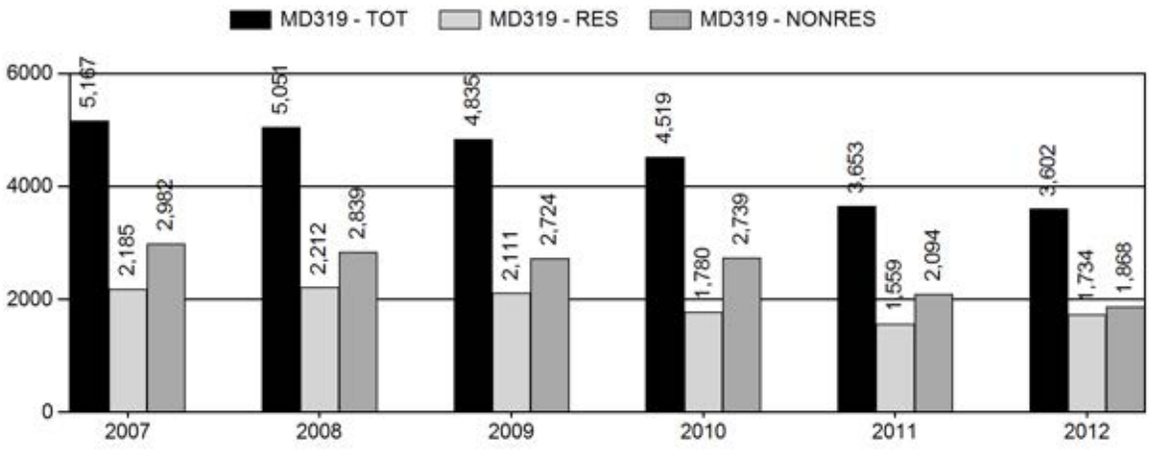
	JCR Year	Proposed
Females ≥ 1 year old:	2%	4.4%
Males ≥ 1 year old:	14%	25.5%
Juveniles (< 1 year old):	.3%	0%
Total:	4.6%	7.6%
Proposed change in post-season population:	8.6%	-7.7%



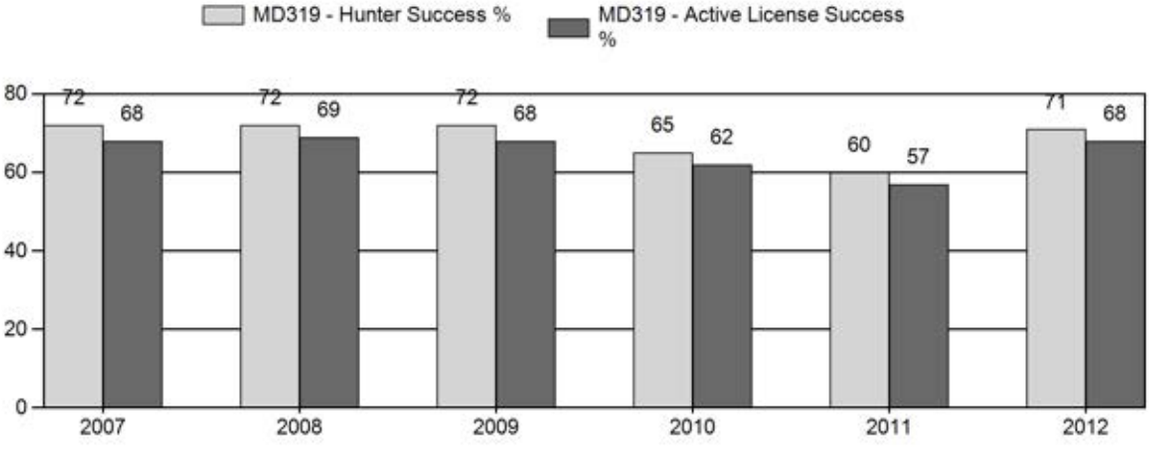
Harvest



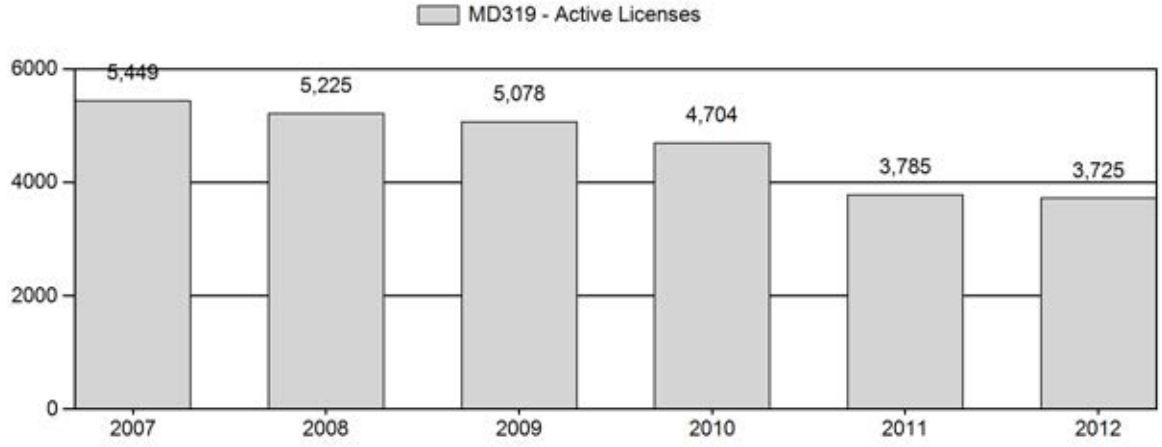
Number of Hunters



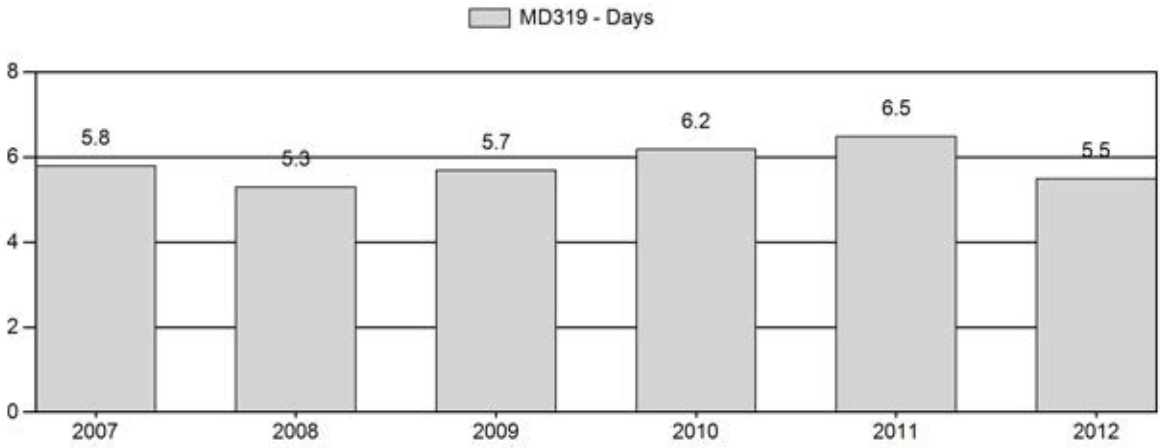
Harvest Success



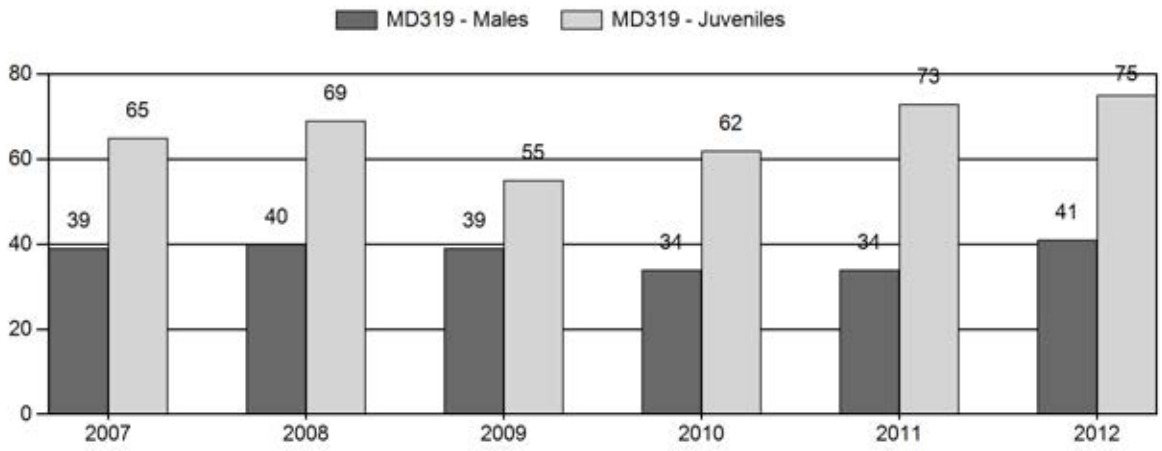
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Mule Deer Herd MD319 - POWDER RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	45,083	168	498	666	19%	1,715	49%	1,107	32%	3,488	2,632	10	29	39	± 2	65	± 3	46
2008	43,528	215	499	714	19%	1,775	48%	1,222	33%	3,711	1,403	12	28	40	± 2	69	± 3	49
2009	36,697	103	415	518	20%	1,336	52%	736	28%	2,590	920	8	31	39	± 2	55	± 3	40
2010	32,092	91	364	455	17%	1,348	51%	832	32%	2,635	1,494	7	27	34	± 2	62	± 3	46
2011	31,351	110	241	351	16%	1,040	48%	755	35%	2,146	1,645	11	23	34	± 3	73	± 4	54
2012	35,300	260	332	592	19%	1,459	46%	1,088	35%	3,139	1,785	18	23	41	± 2	75	± 4	53

2013 HUNTING SEASONS
POWDER RIVER MULE DEER HERD (MD319)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
17	Gen	Oct. 1	Oct. 20		General License; antlered mule deer or any white-tailed deer
18	Gen	Oct. 1	Oct. 20		General License; antlered mule deer or any white-tailed deer
18	6	Oct. 1	Oct. 20	50	Limited quota licenses; doe or fawn
23	Gen	Oct. 1	Oct. 14		General license; antlered deer off private land, any deer on private land
23	6	Oct. 1	Dec.15	1,500	Limited quota licenses; doe or fawn valid on private land
26	Gen	Oct. 1	Oct. 14		General license; antlered deer off private land, any deer on private land
26	6	Oct. 1	Dec.15	1,500	Limited quota licenses; doe or fawn valid on private land
Archery		Sep. 1	Sep. 30		Refer to Section 4 of this Chapter

Hunt Area	Type	Quota change from 2012
18	6	+50
23,26	6	+300
Herd Unit Total	**6**	**+350**
	Region C	**-200**

Management Evaluation

Current Postseason Population Management Objective: 52,000
Management Strategy: Recreational
2012 Postseason Population Estimate: ~35,300
2013 Proposed Postseason Population Estimate: ~32,600

Herd Unit Issues

The postseason population objective for the Powder River Mule Deer herd is 52,000 mule deer. The management strategy is recreational management. The objective and management strategy were last revised in 1989.

Issues associated with this herd include hunter access to private land and trying to balance private and public land use. Nearly all landowners charge access fees or outfit for buck hunting, and tend to cater to non-resident hunters. New GPS technologies are helping hunters find smaller pieces of unmarked public lands, but at the same time this new accessibility has increased complaints of trespass and congestion by neighboring landowners.

The 2012 post-season population estimate was about 35,000, which is only slightly lower than the preceding 5-year average of 37,000. Since around 2008 the population has experienced a declining trend in numbers and poor fawn recruitment, likely influenced by weather factors. This was especially true in Areas 17 and 18. This drop in fawn numbers was probably due to heavy snows in early 2009 followed by a very cold and wet spring. 2009 also experienced a reduction in forage due to an outbreak of grasshoppers, which could have had an effect on overwintering deer in search of forage. Extensive coal bed methane development has occurred in the herd unit and has resulted in a network of roads and other development associated with the infrastructure required to support coal bed methane extraction. The increased traffic was an issue with hunting in the past, however in recent years, development and activity has tapered off substantially. The more pressing issue in this herd unit will be proper reclamation as these wells are abandoned.

Weather

Weather conditions throughout 2012 and into 2013 were extremely dry and warmer than normal. The winters of 2011-2012 and 2012-13 were mild and did not see much for snow accumulation. During the majority of these two winters, the ground was open, with minimal snowpack. As a result over winter survival was high. Although the spring and summer of 2012 were drier than normal, it appears that the fawn to doe ratio did not suffer.

Habitat

Overall, the growing season of 2012 was not very productive. This was due to warmer than normal temperatures and below average moisture. In many areas there was residual growth from the growing season of 2011 and very limited new growth. It did not appear that body condition of mule deer suffered, even given the dry conditions with the potential reduction in forage availability. Given the mild winter of 2012-2013, the deer continue to be in good condition. Should there be a more normal spring and summer during 2013, this herd has the potential to continue its rebound back closer to the objective.

Field Data

In 2012 the fawn to doe ratio was up to 75, which is the highest this herd has experienced since 2005. Hunter satisfaction for this herd was estimated to be around 80% that were satisfied or very satisfied.

Harvest

In 2012 there were around 2,500 animals harvested in this herd unit. In Areas 23 and 26 the Type 6 limited quota licenses were increased from 1,200 to 1,500 licenses for 2013, still valid only on private land. Comments have been received from landowners and hunters that licenses sold out in 2012 and they were unable to achieve desired harvest on private lands, primarily for white-tailed deer. It is anticipated that the majority of the harvest with these licenses will be white-tailed deer. Additionally, 50 Type 6 licenses were added to Hunt Area 18. This was due to landowner complaints in a particular area of Hunt Area 18. Hunter success in this herd unit has averaged 68% over the preceding 5 years, with 2012 having an overall success rate of 71%.

Population

The "Time Specific Juvenile – Constant Adult Mortality Rate" (TSJ-CA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model had the lowest AIC value (112) and seemed to represent what has been occurring on the ground (fair model). The model aligns well with the observed buck ratios, further strengthening its selection as a good fit.

Management Summary

If we attain the projected harvest of 2,700 individuals and experience similar fawn recruitment as seen the last few years, it is anticipated that the population will still decline slightly. Based on the population model we predict a 2013 post-season population of about 32,600.

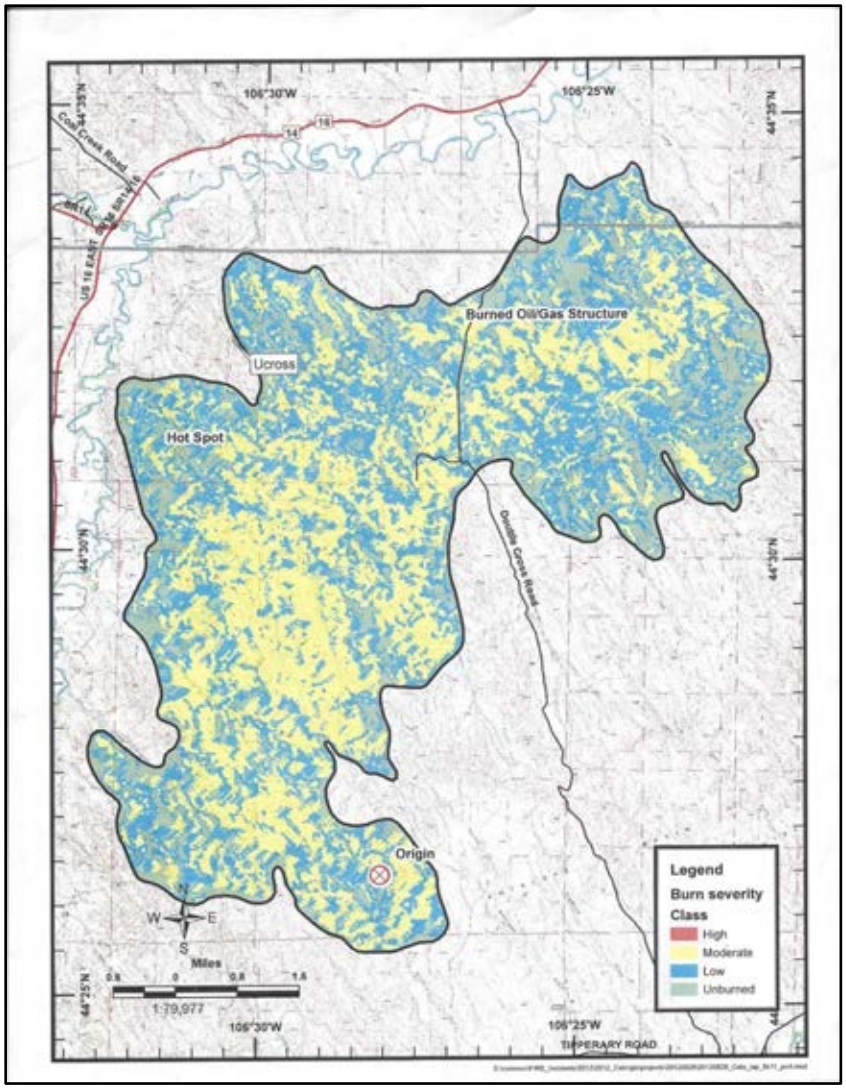
CATO Fire

Extreme drought conditions developed in early summer 2012 which resulted in a June 25th lightning ignited fire about 13 miles northeast of Buffalo in pronghorn Hunt Area 16 and mule deer Hunt Area 26 (Figure 1). The fire burned east of Clear Creek, progressing north and then crossing the Double Cross Road to the east. A total of about 28,000 acres burned including private, state and BLM lands. Most of the burn consisted of sagebrush grassland and mixed-grassland habitats including excellent deer habitat.

The Lake DeSmet Conservation District, Johnson County Weed and Pest District, Bureau of Land Management, Wyoming State lands, Sheridan County Weed and Pest and private landowners cooperated in chemically treating approximately 23,500 acres of the burn minimize the spread of cheatgrass and leafy spurge.

The consortium of agencies is currently working to identify potential areas to reestablish sagebrush to benefit sage-grouse, mule deer, pronghorn and other wildlife.

Figure 1. CATO Fire Burn With Burn Severity.



INPUT	
Species:	Deer
Biologist:	Erika Peckham
Herd Unit & No.:	Powder River MD
Model date:	07/18/12

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	Constant Juvenile & Adult Survival	232	241	☐ CJ,CA Model	
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	104	118	☐ SCJ,SCA M	
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	5	112	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				17786	12688	34787	65261	17503	8878	32132	58513	52000
1994				18905	12419	31022	62346	18874	9453	30492	58819	52000
1995				21294	11337	28168	60799	21290	8087	27719	57097	52000
1996				18268	12986	28691	59944	18233	10213	28275	56720	52000
1997				12107	12374	26824	51306	12107	9226	26744	48077	52000
1998				16210	11094	25108	52412	16210	7997	25097	49305	52000
1999				15297	9640	23320	48256	15292	6277	23253	44822	52000
2000				13455	10284	23864	47602	13447	6624	23624	43695	52000
2001				10634	11350	24950	46935	10619	7709	24701	43029	52000
2002				11269	10547	24140	45955	11259	7016	23846	42120	52000
2003				16058	10150	23615	49823	16043	6480	23236	45760	52000
2004				13868	11810	25215	50893	13812	8245	24547	46603	52000
2005				17153	10362	23403	50918	17094	7505	22622	47221	52000
2006				16197	13696	25790	55684	16172	9987	24853	51012	52000
2007				14356	11457	23350	49164	14308	8608	22166	45083	52000
2008				14405	11133	21979	47517	14333	8375	20820	43528	52000
2009				10557	10004	19959	40521	10454	7267	18976	36697	52000
2010				10134	7904	17272	35310	10115	5589	16388	32092	52000
2011				11073	7016	15655	33744	11030	5128	15193	31351	52000
2012				12241	8913	16966	38120	12241	6661	16416	35318	52000
2013				10516	8619	16423	35557	10461	6419	15708	32587	52000
2014												52000
2015												52000
2016												52000
2017												52000
2018												52000
2019												52000
2020												52000
2021												52000
2022												52000
2023												52000
2024												52000
2025												52000

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.61			0.80		
1994	0.40			0.80		
1995	0.61			0.80		
1996	0.46			0.80		
1997	0.61			0.80		
1998	0.40			0.80		
1999	0.69			0.80		
2000	0.90			0.80		
2001	0.82			0.80		
2002	0.81			0.80		
2003	0.83			0.80		
2004	0.55			0.80		
2005	0.90			0.80		
2006	0.43			0.80		
2007	0.59			0.80		
2008	0.46			0.80		
2009	0.40			0.80		
2010	0.50			0.80		
2011	0.87			0.80		
2012	0.54			0.80		
2013	0.65			0.80		
2014						
2015						
2016						
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Parameters:	Optim cells
Adult Survival =	0.800
Initial Total Male Pop/10,000 =	0.888
Initial Female Pop/10,000 =	3.213

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Classification Counts				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		54.47	2.45	27.63	27.63	1.59	257	3464	2414	6135	30.0	7.6
1994		61.90	2.57	31.00	31.38	1.65	28	2697	482	3207	23.9	1.7
1995		76.81	3.25	29.18	28.79	1.70	3	2954	409	3366	28.7	1.6
1996		64.48	2.52	36.12	36.12	1.72	32	2521	378	2931	21.4	1.4
1997		45.27	1.94	34.50	34.50	1.63	0	2862	73	2935	25.4	0.3
1998		64.59	2.41	31.87	32.40	1.53	0	2815	10	2825	27.9	0.0
1999		65.77	2.50	27.00	26.58	1.39	4	3057	61	3122	34.9	0.3
2000		56.92	2.18	28.04	27.31	1.36	7	3327	218	3552	35.6	1.0
2001		42.99	1.89	31.21	32.21	1.57	14	3310	227	3551	32.1	1.0
2002		47.22	2.05	29.42	29.42	1.52	9	3210	267	3486	33.5	1.2
2003		69.04	2.25	27.89	27.89	1.24	13	3337	344	3694	36.2	1.6
2004		56.27	2.05	33.59	33.59	1.47	51	3241	608	3900	30.2	2.7
2005		75.56	2.63	33.18	31.58	1.47	54	2597	710	3361	27.6	3.3
2006		65.07	2.53	40.19	43.12	1.92	23	3372	852	4247	27.1	3.6
2007		64.55	2.49	38.84	38.83	1.77	44	2590	1076	3710	24.9	5.1
2008		68.85	2.56	40.23	40.23	1.78	65	2507	1054	3626	24.8	5.3
2009		55.09	2.53	38.30	38.77	2.01	94	2488	894	3476	27.4	4.9
2010		61.72	2.72	34.10	33.75	1.83	17	2105	803	2925	29.3	5.1
2011		72.60	3.47	33.75	33.75	2.08	39	1716	420	2175	26.9	3.0
2012		74.57	2.99	40.58	40.58	1.98	3	2036	502	2541	25.3	3.2
2013		66.59	2.82	40.86	37.79	1.93	50	2000	650	2700	25.5	4.4
2014												
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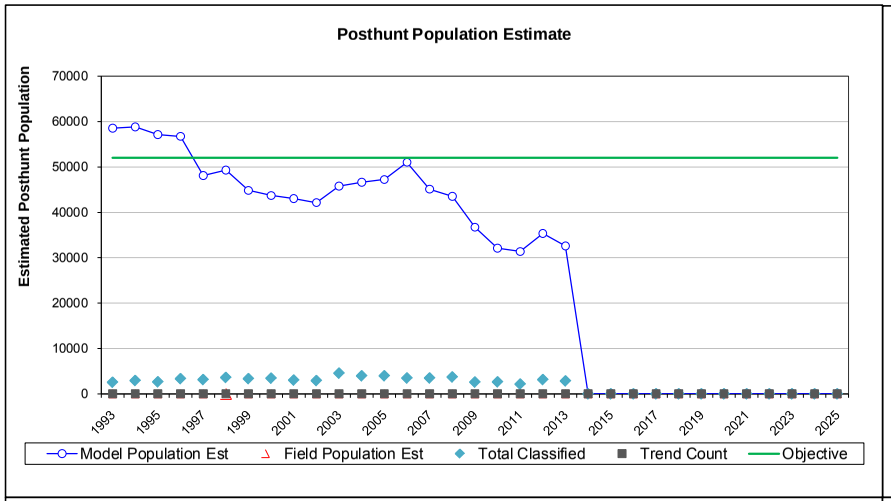
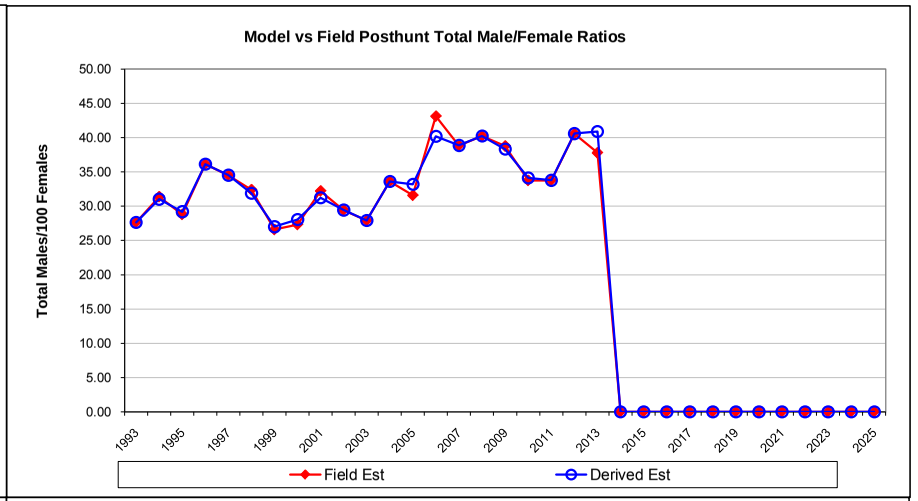
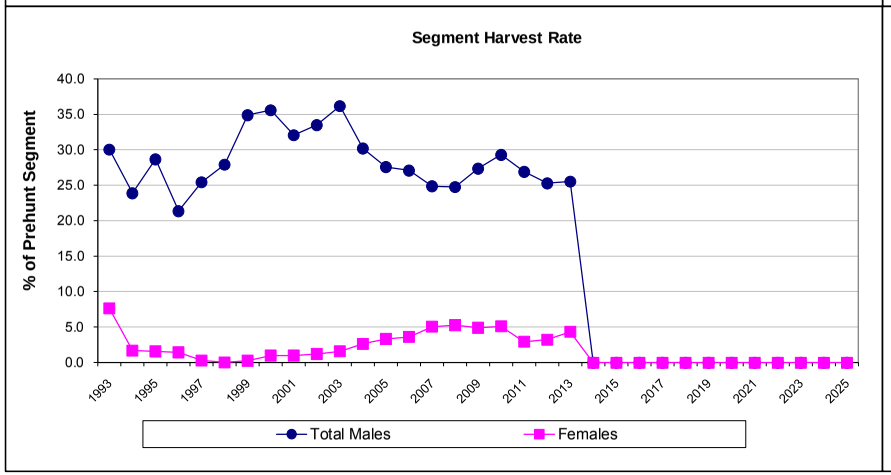
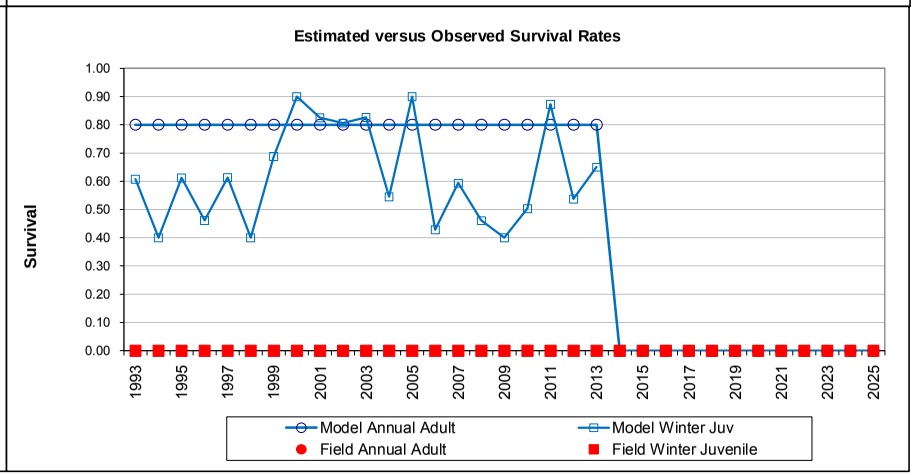
2023												
2024												
2025												

FIGURES









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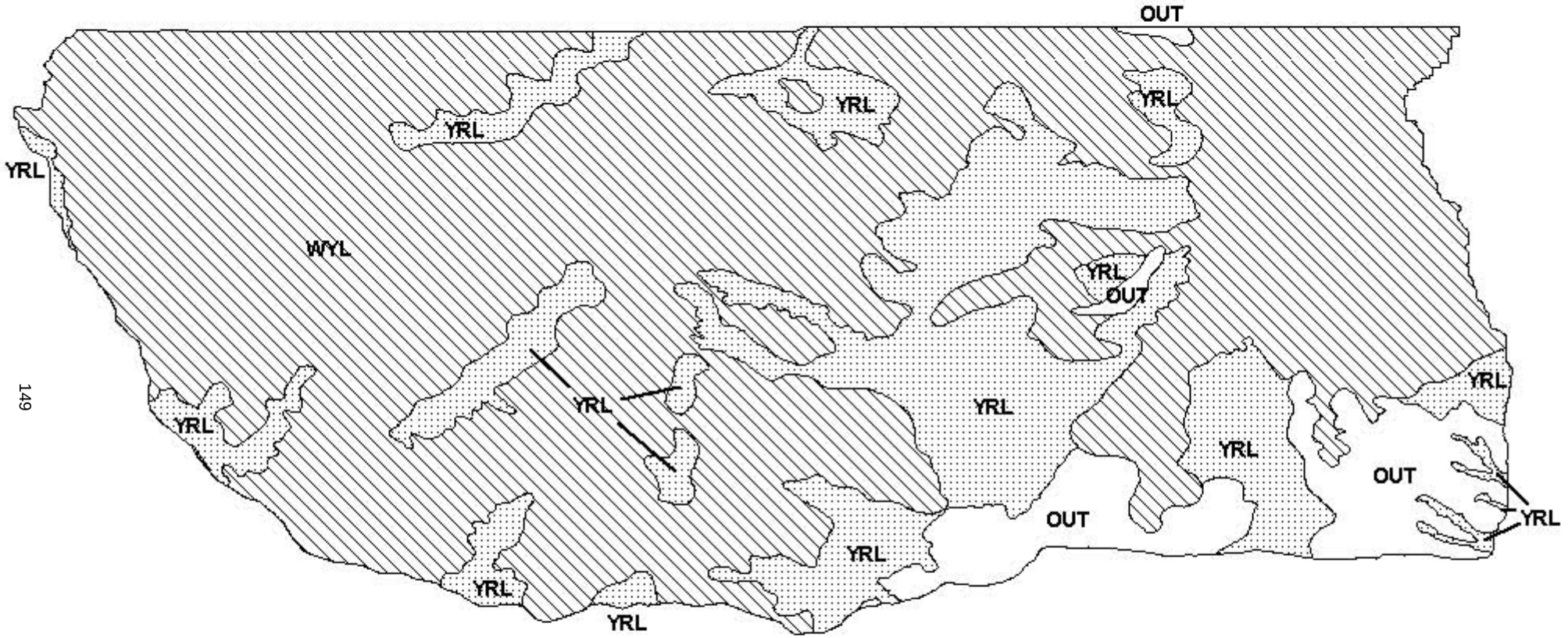


Mule Deer (MD319) - Powder River
HA 17, 18, 23, 26
Revised - 3/87

2012 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2012 - 5/31/2013

HERD: MD320 - PUMPKIN BUTTES

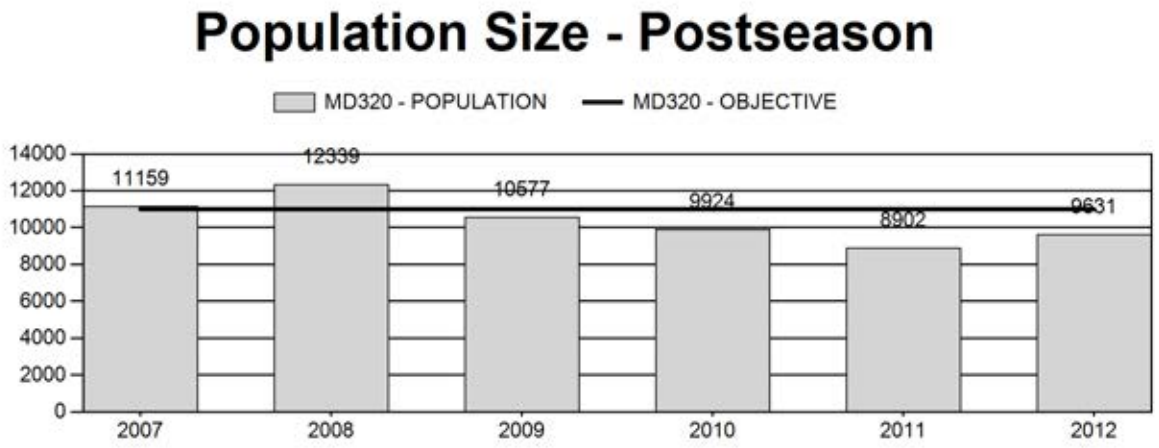
HUNT AREAS: 19-20, 29, 31
PREPARED BY: DAN THIELE

	2007 - 2011 Average	2012	2013 Proposed
Population:	10,580	9,631	9,326
Harvest:	756	710	700
Hunters:	1,103	1,046	1,100
Hunter Success:	69%	68%	64%
Active Licenses:	1,153	1,061	1,100
Active License Percent:	66%	67%	64%
Recreation Days:	4,144	3,934	4,000
Days Per Animal:	5.5	5.5	5.7
Males per 100 Females	46	41	
Juveniles per 100 Females	67	64	

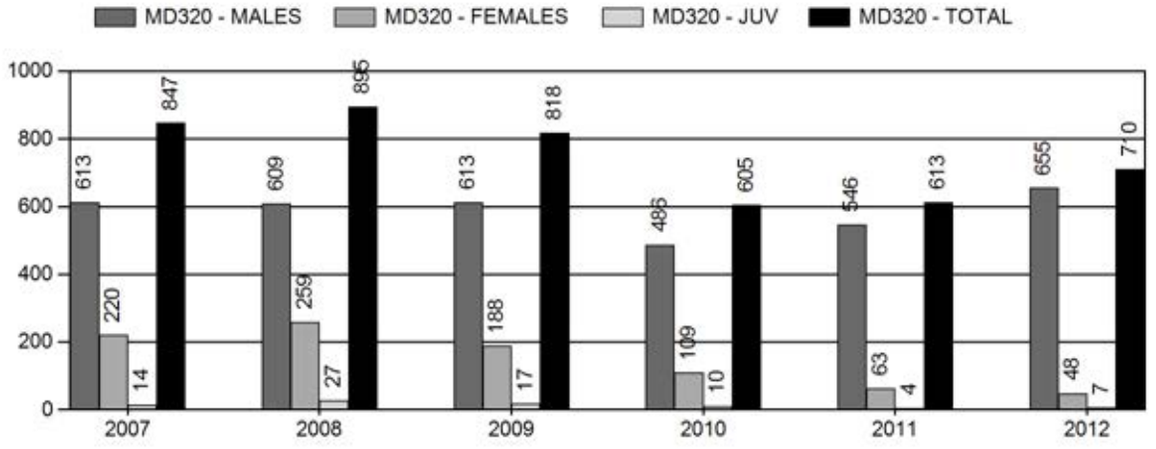
Population Objective:	11,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-12.4%
Number of years population has been + or - objective in recent trend:	4
Model Date:	5/23/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

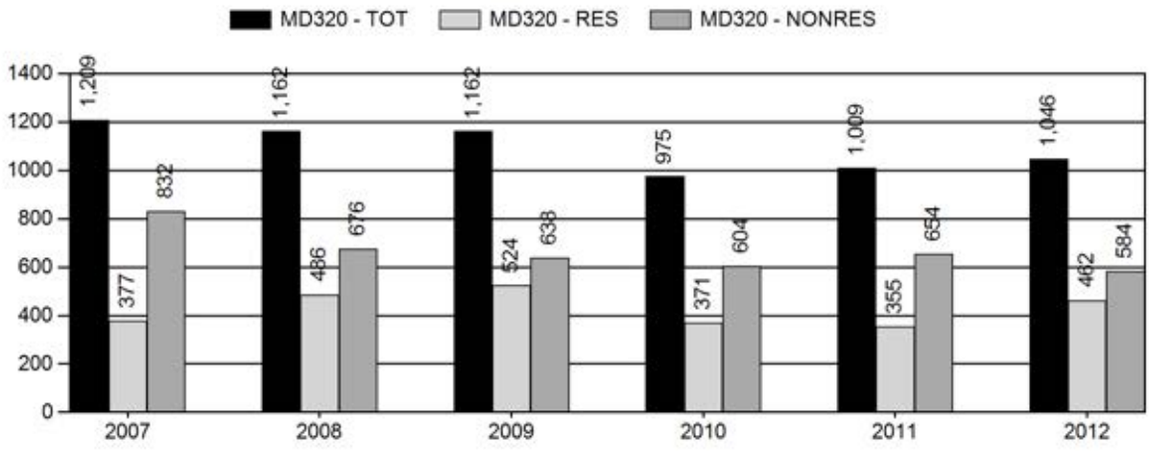
	JCR Year	Proposed
Females ≥ 1 year old:	1%	1%
Males ≥ 1 year old:	27%	30%
Juveniles (< 1 year old):	0%	0%
Total:	7%	7%
Proposed change in post-season population:	+8%	-3%



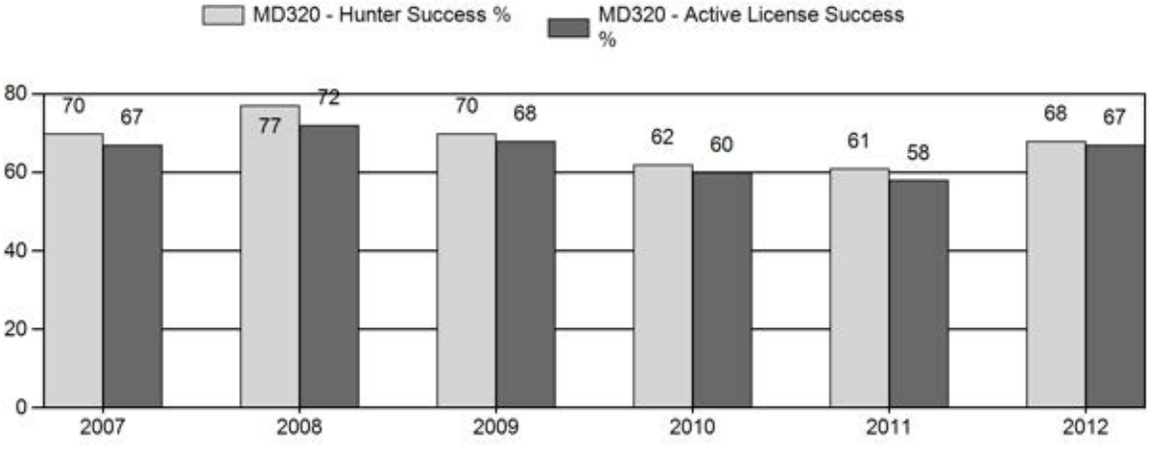
Harvest



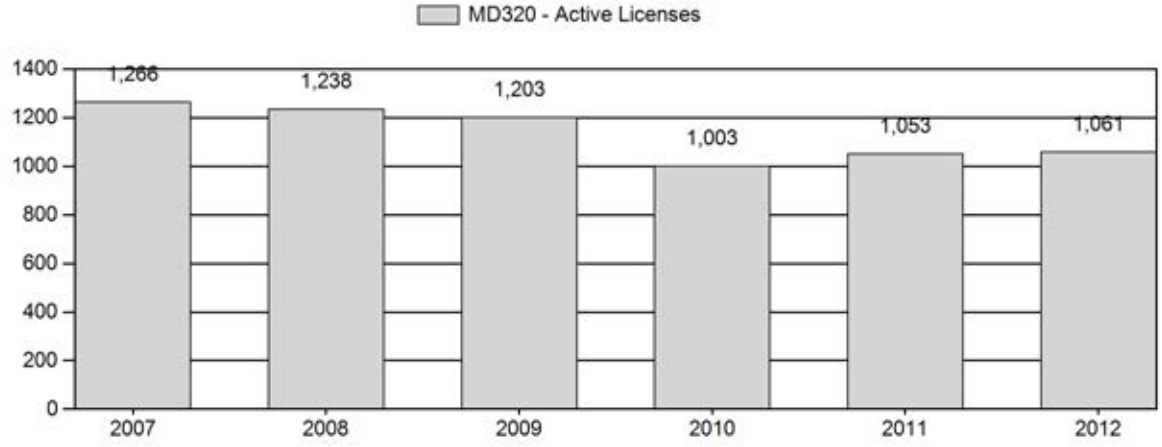
Number of Hunters



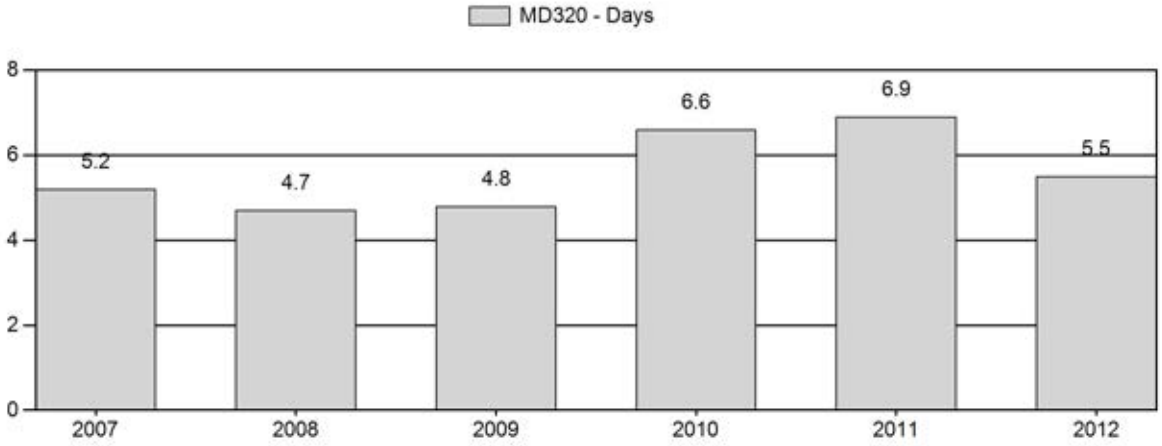
Harvest Success



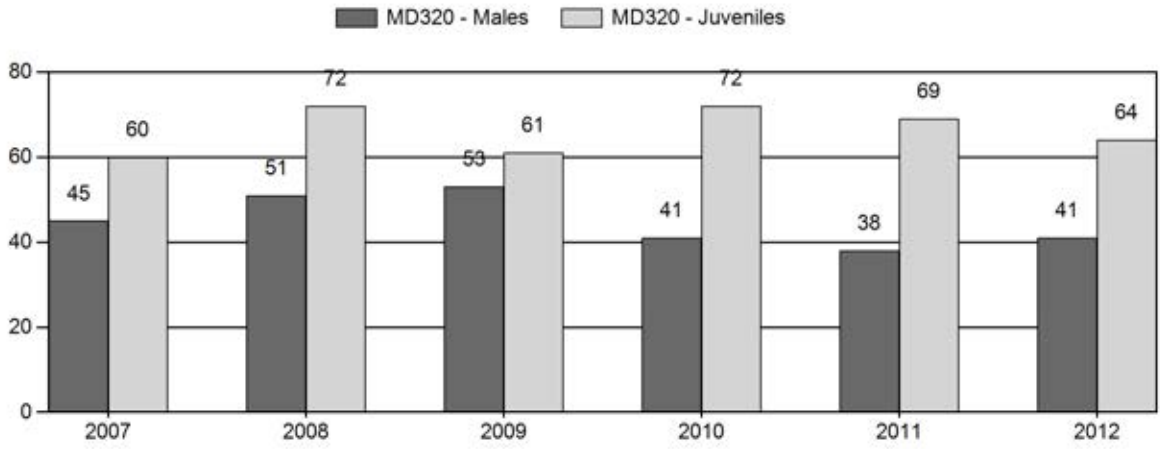
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Mule Deer Herd MD320 - PUMPKIN BUTTES

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	11,159	110	285	395	22%	883	49%	533	29%	1,811	1,165	12	32	45	± 3	60	± 4	42
2008	12,339	137	300	437	23%	861	45%	622	32%	1,920	1,605	16	35	51	± 4	72	± 4	48
2009	10,577	111	269	380	25%	715	47%	433	28%	1,528	1,250	16	38	53	± 4	61	± 4	40
2010	9,924	75	198	273	19%	659	47%	477	34%	1,409	1,493	11	30	41	± 4	72	± 5	51
2011	8,902	76	225	301	18%	795	48%	545	33%	1,641	1,362	10	28	38	± 3	69	± 4	50
2012	9,700	119	182	301	20%	732	49%	470	31%	1,503	1,234	16	25	41	± 3	64	± 4	45

2013 HUNTING SEASONS
PUMPKIN BUTTES MULE DEER HERD (MD320)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
19		Oct. 1	Oct. 20		General license; antlered mule deer
20		Oct. 1	Oct. 20		General license; antlered mule deer
19, 20	6	Oct. 1	Oct. 31	25	Limited quota licenses; doe or fawn valid on private land
29		Oct. 1	Oct. 14		General license, antlered deer off private land; any deer on private land
31		Oct. 1	Oct. 10		General license; antlered deer
Archery		Sep. 1	Sep. 30		Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2012
19, 20	6	-25
Herd Unit Total	**6**	**-25**
	Region C	**-200**

Management Evaluation
Current Postseason Population Management Objective: 11,000
Management Strategy: Recreational
2012 Postseason Population Estimate: ~9,600
2013 Proposed Postseason Population Estimate: ~9,300

Herd Unit Issues

The Pumpkin Buttes Mule Deer Herd Unit has a post-season population objective of 11,000 deer. The management strategy is recreational management. The objective and management strategy were last revised in 1988 but are being reviewed this spring.

This herd unit is largely private land with limited areas of accessible public lands. Limiting hunting on public lands to antlered deer helps maintain hunting recreation for those unable or unwilling to access private lands.

Coalbed methane gas development has slowed after 10 years of intense development in Areas 19 and 20 and the northeast portion of Area 29. Interest in deep oil is increasing at this time. Publicly accessible BLM and state lands in the northern portions of Areas 19 and 29 are

particularly problematic as intensive development activity reduced quality hunting opportunity. In recent years these lands attracted fewer hunters.

Weather

Weather in the area of the Pumpkin Buttes Herd Unit during 2012 turned extremely warm and dry after several good moisture years. The Palmer drought index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "very moist" conditions for January 2012 but progressed to "extreme drought" by January 2013. The National Weather Service in Sheridan reported 2012 as the driest year since 1960 and the fourth driest year in 105 years with 9.53 inches of precipitation (14.16" ave). It was also the sixth warmest year on record with an average temperature of 48.1° F, the warmest year since 2006. Winter conditions were mild so above average mortality was not observed.

Habitat

There are two Wyoming big sagebrush transects in this herd unit. Utilization during the 2011-12 winter was very light (less than 5% of leaders browsed) as mule deer and pronghorn were dispersed over winter/yearlong range. Production measured in September 2012 averaged 12 mm per leader on Indian Creek compared to 30 mm per leader in 2011. The Schoonover transect averaged 13 mm in fall 2012.

Field Data

Classifications following the hunting season resulted in a fawn ratio of 64:100 and a buck ratio of 41:100. The fawn ratio was the lowest of the last three years but ratios have been adequate to maintain this population given the low antlerless harvest and lack of severe winter weather. Buck ratios have trended down due to stable harvest and a decreasing population. Hunters were highly satisfied with the 2012 hunting season with 77% expressing satisfaction with their hunt.

Harvest Data

The 2012 harvest survey reported increases in harvest and hunter success over the previous two years. In fact, buck harvest reached a six year high. Even though hunter numbers have decreased over 15% during the period, hunters have had to expend more effort to harvest deer. These data reflect the decreasing population trend predicted by the model. Furthermore, the postseason landowner survey shows a strong indication that landowners believe the population has decreased since 2005. In 2011 and 2012, 70% and 63% of responding landowners reported deer numbers were too low, respectively. The Region C quota sold out, however, 229 licenses remained after the draw.

Population

This population is estimated at about 9,600 mule deer, 12% below the population objective. The population estimate was generated with the newly adopted EXCEL spreadsheet model. No independent population estimates have been collected for this herd. The Time Specific Juvenile/Constant Adult model (TSJ/CA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it had a higher AIC value (121 vs. 100). This model produced fawn survival estimates within the range of parameters selected while the CJ/CA model selected the lowest possible survival rate allowed. Furthermore, both the CJ/CA and Semi-Constant

Juvenile/Semi-Constant Adult (SCJ/SCA) predict a stable to increasing population whereas the selected model shows a decreasing population, reflective of harvest data, classifications, the landowner survey and anecdotal observations. The model indicates this population decreased about 20% from 2007 through 2011 followed by a slight increase in 2012. The significant differences in the three models lead to some uncertainty in the credibility of the model. Therefore, this model is considered a fair model.

Management Summary

The nonresident Region C license quota was reduced 11% in 2012 to 2,400 licenses and Areas 19 and 20 general license seasons were limited to antlered deer. Buck harvest and hunter success increased in 2012, but this was influenced by the private land status of the hunt areas.

The Region C quota has been reduced an additional 200 licenses (2,200 licenses) for the 2013 hunting season. Modeling stable harvest and a similar fawn ratio results in an estimate of 9,300 deer (-3%) following the hunting season.

INPUT	
Species:	Mule Deer
Biologist:	Dan Thiele
Herd Unit & No.:	Pumpkin Buttes
Model date:	05/23/13

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	Constant Juvenile & Adult Survival	91	100	☐ CJ,CA Model	
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	115	127	☐ SCJ,SCA	
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	14	121	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				3537	2623	6627	12788	3483	1709	6195	11387	11000
1994				3689	2495	6101	12285	3667	1754	5923	11345	11000
1995				3596	2143	5494	11233	3570	1260	5203	10032	11000
1996				3984	2450	5619	12052	3984	1907	5560	11451	11000
1997				3182	2440	5376	10998	3167	1708	5291	10166	11000
1998				4186	2798	5678	12661	4173	1888	5587	11648	11000
1999				4063	3135	6109	13307	4059	1977	5967	12003	11000
2000				3410	3415	6622	13448	3405	2354	6525	12284	11000
2001				2329	3253	6605	12188	2318	2384	6452	11155	11000
2002				2483	2494	5764	10741	2466	1674	5591	9731	11000
2003				4096	2378	5526	12000	4055	1527	5415	10997	11000
2004				2804	2275	5400	10479	2780	1544	5206	9530	11000
2005				4195	2492	5435	12122	4149	1770	5166	11085	11000
2006				3780	3290	6019	13089	3776	2537	5694	12007	11000
2007				3291	3131	5669	12091	3276	2457	5427	11159	11000
2008				4040	3449	5836	13324	4010	2779	5551	12339	11000
2009				3103	3073	5301	11477	3085	2399	5094	10577	11000
2010				3334	2545	4711	10590	3323	2010	4591	9924	11000
2011				2942	2280	4354	9577	2938	1680	4285	8902	11000
2012				3019	2649	4743	10412	3012	1929	4691	9631	11000
2013				3111	2383	4602	10096	3100	1668	4558	9326	11000
2014												11000
2015												11000
2016												11000
2017												11000
2018												11000
2019												11000
2020												11000
2021												11000
2022												11000
2023												11000
2024												11000
2025												11000

Survival and Initial Population Estimates

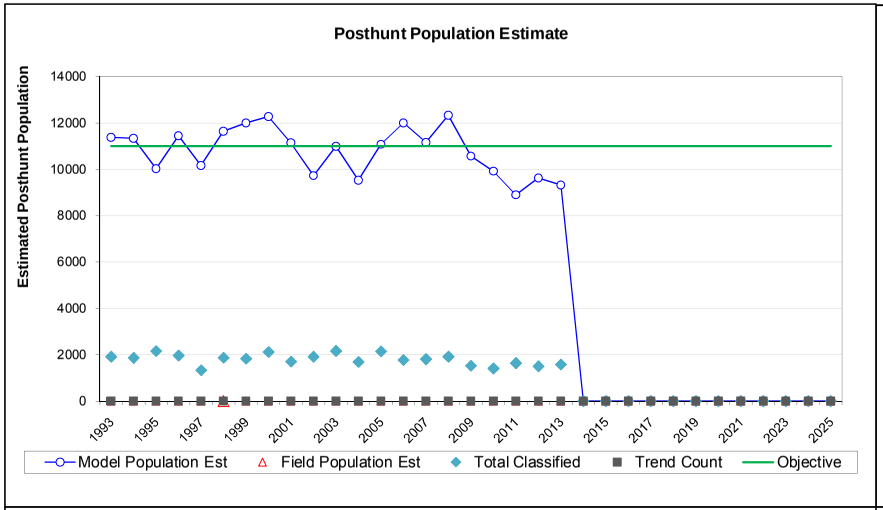
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.64			0.80		
1994	0.40			0.80		
1995	0.81			0.80		
1996	0.46			0.80		
1997	0.90			0.80		
1998	0.78			0.80		
1999	0.90			0.80		
2000	0.80			0.80		
2001	0.50			0.80		
2002	0.84			0.80		
2003	0.52			0.80		
2004	0.90			0.80		
2005	0.90			0.80		
2006	0.58			0.80		
2007	0.90			0.80		
2008	0.42			0.80		
2009	0.40			0.80		
2010	0.40			0.80		
2011	0.88			0.80		
2012	0.55			0.80		
2013	0.65			0.80		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

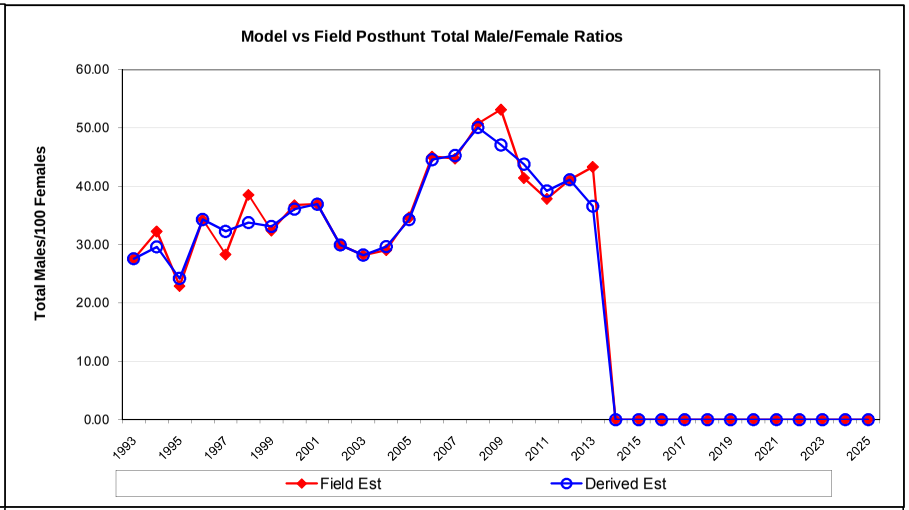
Parameters:	Optim cells
Adult Survival =	0.804
Initial Total Male Pop/10,000 =	0.171
Initial Female Pop/10,000 =	0.620

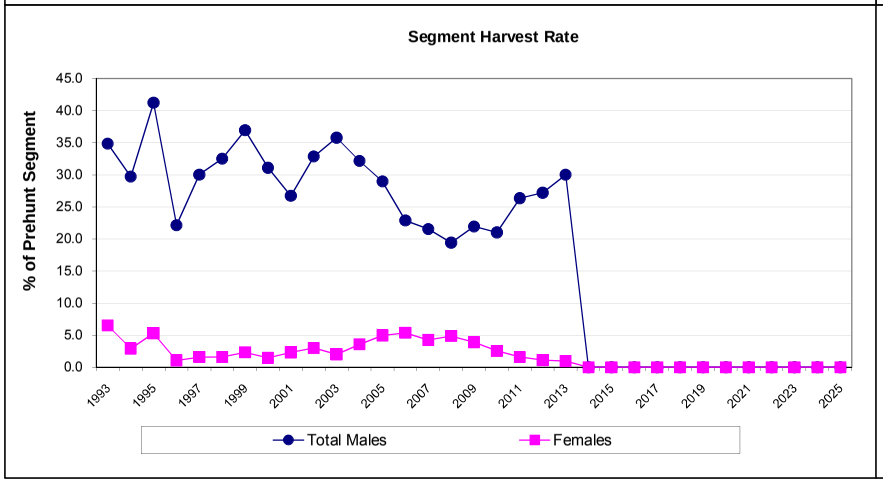
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

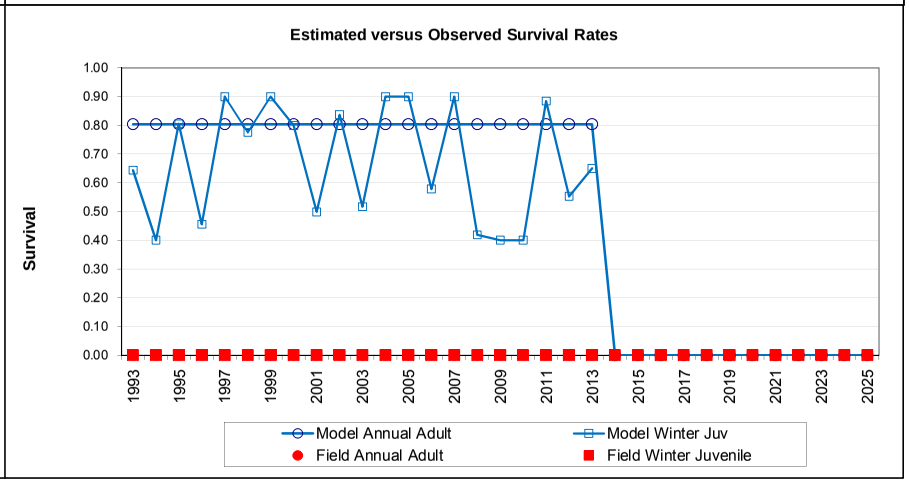
Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		56.23	2.90	27.59	27.59	1.84	49	831	393	1273	34.8	6.5
1994		61.91	3.23	29.60	32.26	2.11	20	674	161	855	29.7	2.9
1995		68.61	3.20	24.21	22.90	1.58	24	803	265	1092	41.2	5.3
1996		71.65	3.59	34.31	34.31	2.20	0	493	54	547	22.1	1.1
1997		59.86	3.67	32.28	28.31	2.26	14	666	77	757	30.0	1.6
1998		74.69	3.86	33.79	38.54	2.47	12	827	82	921	32.5	1.6
1999		68.02	3.54	33.14	32.42	2.17	4	1053	129	1186	36.9	2.3
2000		52.18	2.66	36.07	36.78	2.12	5	965	88	1058	31.1	1.5
2001		35.93	2.22	36.94	36.94	2.26	10	790	139	939	26.7	2.3
2002		44.10	2.40	29.95	29.95	1.88	16	745	157	918	32.9	3.0
2003		74.88	3.50	28.21	28.21	1.84	38	773	101	912	35.8	2.0
2004		53.39	2.97	29.66	29.06	2.01	22	665	176	863	32.1	3.6
2005		80.32	3.80	34.27	34.67	2.16	42	656	245	943	29.0	5.0
2006		66.31	3.62	44.56	45.12	2.79	4	684	295	983	22.9	5.4
2007		60.36	3.31	45.28	44.73	2.71	14	613	220	847	21.5	4.3
2008		72.24	3.80	50.07	50.75	2.98	27	609	259	895	19.4	4.9
2009		60.56	3.69	47.09	53.15	3.37	17	613	188	818	21.9	3.9
2010		72.38	4.35	43.78	41.43	2.98	10	486	109	605	21.0	2.5
2011		68.55	3.81	39.20	37.86	2.56	4	546	63	613	26.3	1.6
2012		64.21	3.80	41.12	41.12	2.82	7	655	48	710	27.2	1.1
2013		68.00	3.90	36.58	43.33	2.88	10	650	40	700	30.0	1.0
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES









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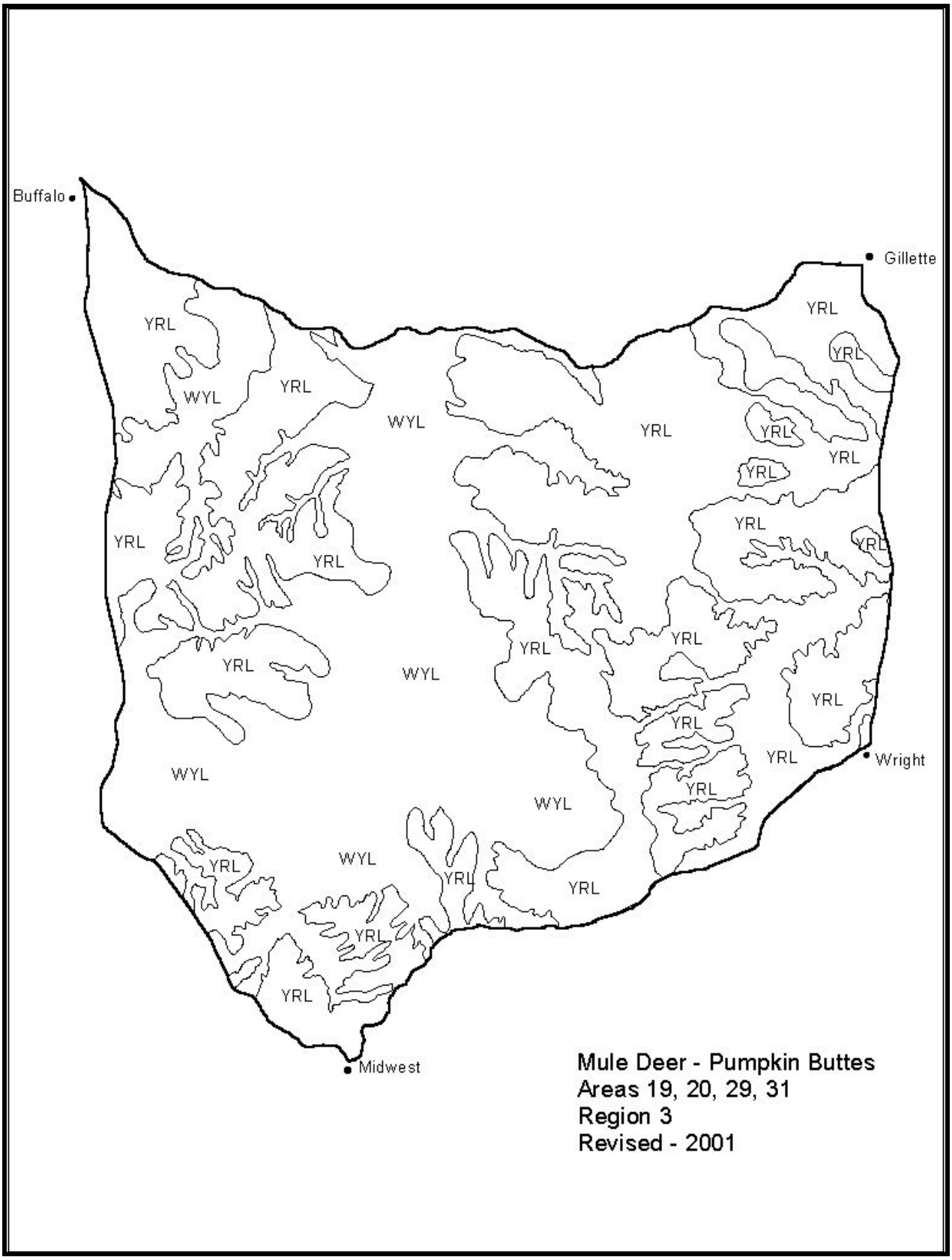

Buffalo
Gillette
Wright
Midwest
YRL
WYL
Mule Deer - Pumpkin Buttes
Areas 19, 20, 29, 31
Region 3
Revised - 2001

2012 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2012 - 5/31/2013

HERD: MD321 - NORTH BIGHORN

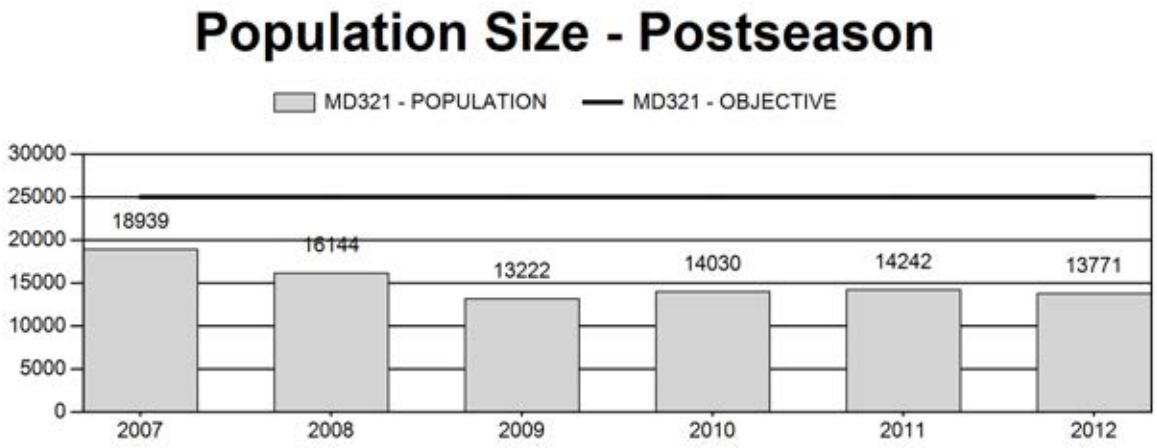
HUNT AREAS: 24-25, 27-28, 50-53
PREPARED BY: TIM THOMAS

	2007 - 2011 Average	2012	2013 Proposed
Population:	15,315	13,771	13,436
Harvest:	1,927	1,653	1,530
Hunters:	4,164	3,561	3,400
Hunter Success:	46%	46%	45%
Active Licenses:	4,424	3,759	3,500
Active License Percent:	44%	44%	44%
Recreation Days:	20,240	20,331	18,500
Days Per Animal:	10.5	12.3	12.1
Males per 100 Females	32	34	
Juveniles per 100 Females	71	80	

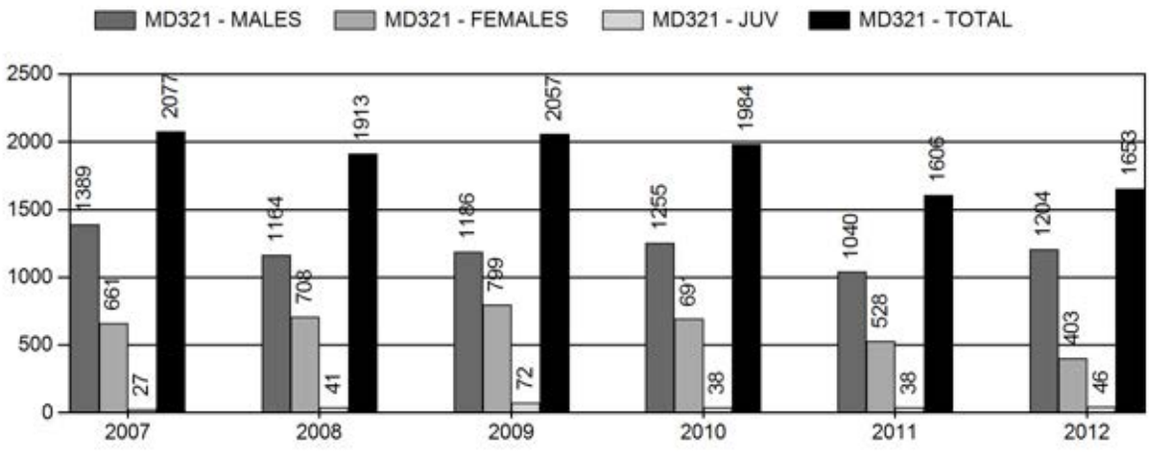
Population Objective:	25,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-44.9%
Number of years population has been + or - objective in recent trend:	15
Model Date:	3/4/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

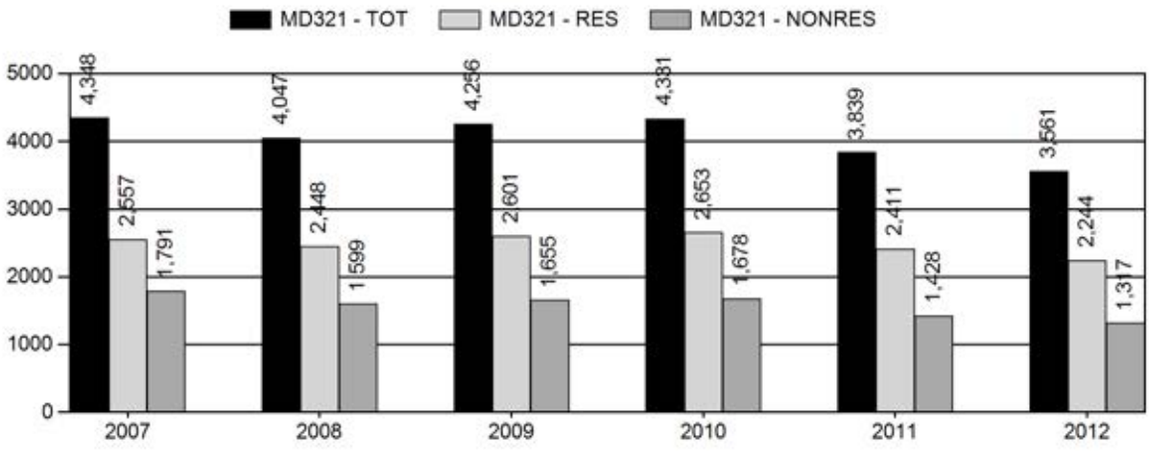
	JCR Year	Proposed
Females ≥ 1 year old:	6%	5%
Males ≥ 1 year old:	38%	37%
Juveniles (< 1 year old):	1%	1%
Total:	11%	11%
Proposed change in post-season population:	-3%	-3%



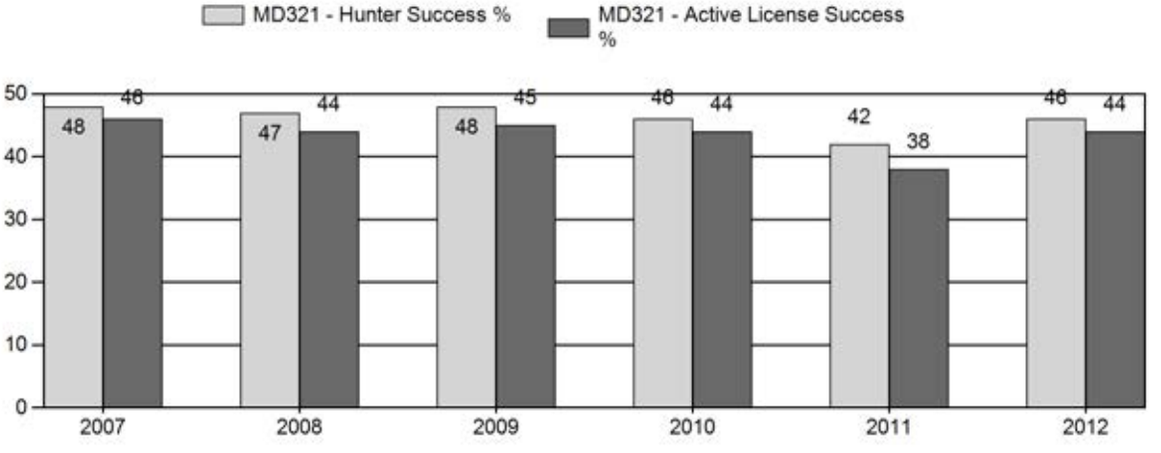
Harvest



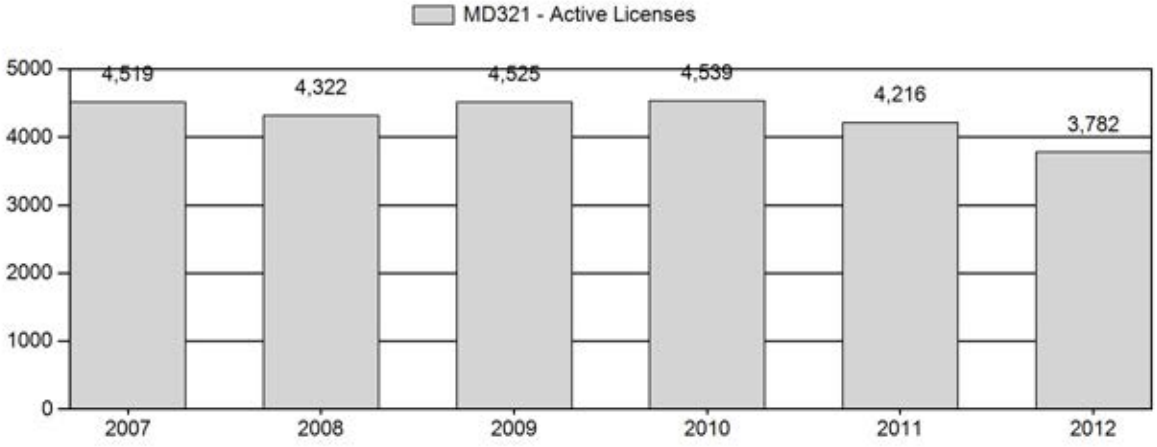
Number of Hunters



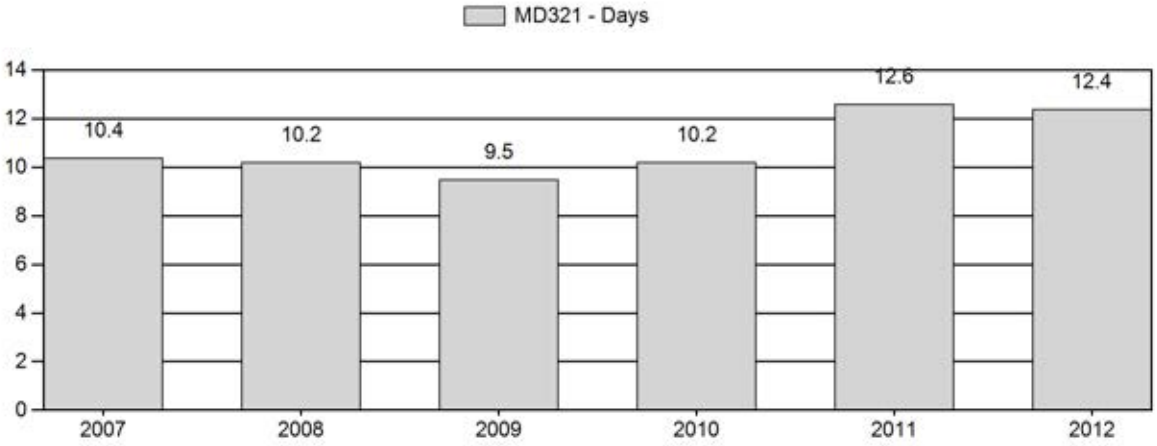
Harvest Success



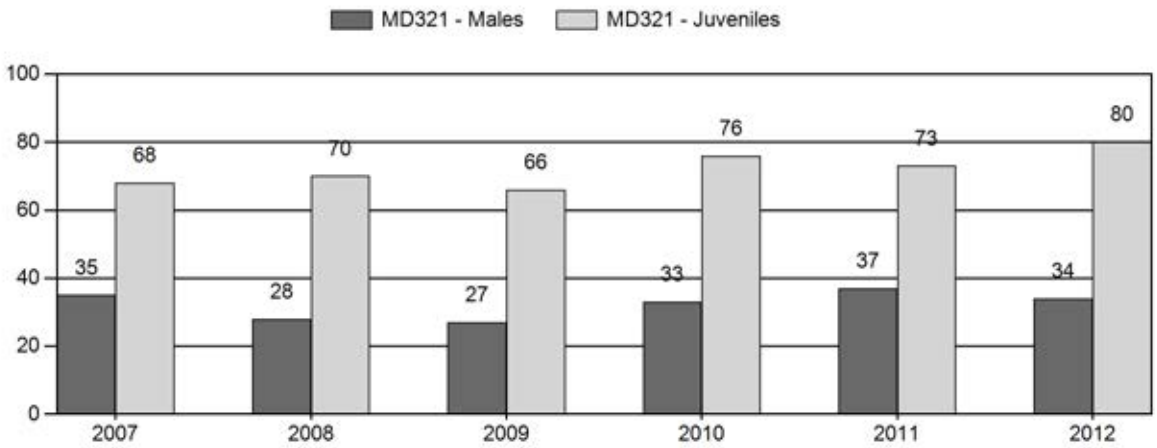
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Mule Deer Herd MD321 - NORTH BIGHORN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	18,939	114	224	338	17%	973	49%	665	34%	1,976	2,308	12	23	35	± 3	68	± 4	51
2008	16,144	126	235	361	14%	1,286	51%	896	35%	2,543	1,448	10	18	28	± 2	70	± 4	54
2009	13,222	117	204	321	14%	1,204	52%	792	34%	2,317	1,289	10	17	27	± 2	66	± 4	52
2010	14,030	136	226	362	16%	1,099	48%	838	36%	2,299	1,672	12	21	33	± 2	76	± 4	57
2011	14,242	133	226	359	18%	962	47%	705	35%	2,026	1,588	14	23	37	± 3	73	± 4	53
2012	13,828	118	135	253	16%	749	47%	596	37%	1,598	1,886	16	18	34	± 3	80	± 5	59

2013 HUNTING SEASONS
NORTH BIGHORN MULE DEER HERD (MD321)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
24		Oct. 15	Oct. 31		General license; antlered deer off private land, any deer on private land
	6	Sep. 1	Dec. 15	600	Limited quota licenses; doe or fawn valid on private land
25		Oct. 15	Oct. 31		General license; antlered mule deer or any white-tailed deer
27		Oct. 15	Oct. 31		General license; any deer
28		Oct. 15	Oct. 31		General license; antlered mule deer or any white-tailed deer
50		Oct. 15	Oct. 24		General license; antlered deer
51		Oct. 15	Oct. 24		General license; any deer
	6	Oct. 1	Nov. 30	100	Limited quota licenses; doe or fawn valid within one (1) mile of Shell Creek
52		Oct. 15	Oct. 24		General license; any deer
	6	Oct. 1	Nov. 30	25	Limited quota licenses; doe or fawn valid on private land north of Crystal Creek
53		Oct. 15	Oct. 31		General license; antlered deer
Archery		Sep. 1	Sep. 30		General license; any deer Limited quota licenses; Refer to Section 4 of this Chapter

Hunt Area	Type	Quota change from 2012
24	6	-600
25	6	-50
52	6	-25
Herd Unit Total	**6**	**-675**

Management Evaluation

Current Postseason Population Management Objective: 25,000
Management Strategy: Recreational
2012 Postseason Population Estimate: ~ 13,800
2013 Proposed Postseason Population Estimate: ~ 13,400

Herd Unit Issues

The management objective for the North Bighorn Mule Deer Herd Unit is a post-season population objective of 25,000 mule deer and the management strategy is recreational management. The objective and management strategy were last revised in 1996.

Weather

The spring and summer of 2012 was warm and dry, resulting in drought conditions throughout the region. The winter of 2012-13 was generally mild and open until late January, when several winter storms occurred weekly through February and again in April. Drought conditions do not appear to have negatively affected mule deer at this time. Deer, especially females who successfully raised a fawn in 2012, entered the winter with little to no fat, which could affect over winter survival as well as their ability to successfully carry a fetus to term. We saw fawns dying from winter conditions in the Sheridan area in the late winter and early spring.

Habitat

We do not have an established habitat transect in this herd unit. Most deer in this herd unit migrate to higher elevations in the Bighorn Mountains during the spring. Deer return to the foothills of the Bighorn Mountains in the fall and winter at lower elevations, often on private lands.

Field Data

Fawn production has been good the past 3 years (73-80 fawns:100 does), which could help this population increase. Observed bucks:100 does continues to be in the mid-30s (34 bucks:100 does), but a lot of these bucks appear to be young aged animals. Mature bucks (i.e. 5+ years old) seem to be lacking from this population, resulting in smaller antlered animals generally available for harvest. Hunters have consistently requested larger antlered deer in this herd unit.

Deer hunters in this herd unit were generally happy with their hunt, according to the hunter satisfaction survey. Of 964 hunters surveyed, the majority (70%) were satisfied or very satisfied, while only 14% indicated they were dissatisfied or very dissatisfied. The balance of responses were neutral.

Harvest

In 2012, hunters harvested an estimated 1,653 mule deer, similar to 2011 but 14% below the 10 year average harvest. Female harvest decreased 25% while buck harvest increased 17%. The decline in doe harvest was a result of reduced licenses for antlerless harvest and reduced access to private lands for mule deer doe harvest. Hunter success was 46%, similar to the 10 year

average. Hunters spent about 12.4 days hunting per deer harvested, higher than the 10 year average of 10.7 days/harvest.

Population

The 2012 post-season population estimate was about 13,800 with the population relatively stable to trending slowly downward. This population likely peaked in recent years in 2006 and has decreased since then. Hunters and field personnel have noticed a decline in this deer population over the past several years.

The "Time-Specific Juvenile – Constant Adult Survival Rate" (TSJ,CA) spreadsheet model was chosen to estimate the postseason population estimate of this herd. This model had the highest relative Akaike information criterion (AIC) value of all the models (112 compared to 80 or 104), but also had the lowest fit (4 compared to 45 or 95). This model was selected because it appeared to reasonably simulate the perceived population dynamics of this herd unit. Since we do not have an independent population estimate or survival data for this herd, we consider this model "fair". The SCJ,SCA model had the lowest relative AIC value, but we do not have any year specific survival rates for this, or surrounding, herd units to use to properly adjust this model with. The CJ,CJ model has a similar relative AIC value, but models the population significantly higher than thought by managers.

Management Summary

Hunting seasons traditionally run during the last two weeks of October, opening on October 15 and closing on different dates, depending on the hunt area and year. An archery pre-season occurs the entire month of September for any deer. Hunting on public land, primarily the Bighorn National Forest, has generally been conservative. Hunting on private land has generally been more liberal. We reduced Area 24 Type 6 licenses for 2013. In 2012, about 75% of the harvest on this license type was for white-tailed deer. Unlimited Area 24 Type 8 (doe/fawn white-tailed deer) licenses will be available in 2013, which should address any demand for white-tailed deer harvest.

We estimate a harvest of 1,500 deer in 2013. Most of the reduction in harvest will be in antlerless harvest. With average recruitment and the proposed harvest, we estimate a 2013 post-season population of about 13,400 mule deer, still well below the management objective.

Deer Control within Cities of Buffalo and Sheridan

High deer numbers within and adjacent to the Cities of Buffalo and Sheridan have resulted in numerous conflicts, including damage to landscaping, deer-vehicle collisions, and deer-dog interactions. As a result the cities of Buffalo and Sheridan continued their urban deer reduction programs in 2012. Below is summary of these efforts. Complete reports in compliance with their respective Chapter 56 report are on file at the Casper Regional Office.

Buffalo

This was the fourth year the city of Buffalo removed deer within the city limits. Sixty-one deer (51 white-tail deer and 10 mule deer) were removed over five days, all of which tested negative for chronic wasting disease. The deer were processed and donated to the food pantry. A summary of the Buffalo program is provided in Table 1.

Table 1. City of Buffalo Deer Reduction Program Summary, 2009-2012.

	2009	2010	2011	2012
No Deer Permited	50	75	100	60
No. of Days	2	5	4	5
Mule Deer	16	16	35	10
White-tailed Deer	34	59	26	51
Total	**50**	**75**	**61**	**61**
CWD Positive	0	3 WTD	0	0

Sheridan

In 2011, 100 deer were taken, including 51 mule deer and 49 white-tailed deer. Mule deer taken included 29 adult does, 21 fawns and 1 adult buck that was already injured (broken leg).

In 2012, 81 deer were taken, including 42 mule deer and 39 white-tailed deer. One fawn mule deer appeared sick and was disposed of at the Sheridan landfill.

All deer have tested negative for chronic wasting disease (CWD). All deer are either donated whole to individuals or processed and donated to food banks.

Any calls of nuisance deer are referred to the Police Department to specifically target problem deer.

INPUT	
Species:	Mule Deer
Biologist:	Timothy P Thomas
Herd Unit & No.:	North Bighorn
Model date:	03/04/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	95	104	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	46	80	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	4	112	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1993				10653	6679	17847	35178	10568	3999	15855	30422	25000
1994				8914	6126	15614	30654	8862	3823	14312	26997	25000
1995				7975	5181	13575	26731	7909	3424	12665	23998	25000
1996				7376	4484	11879	23739	7353	2508	11267	21128	25000
1997				6839	3558	10567	20964	6828	2340	10378	19546	25000
1998				7204	4268	10701	22174	7190	2564	10585	20339	25000
1999				7883	4684	11102	23669	7875	2775	10977	21627	25000
2000				6196	4226	10790	21212	6187	2314	10612	19114	25000
2001				6713	4271	10911	21896	6689	2827	10609	20125	25000
2002				6389	3600	9828	19817	6336	2291	9561	18188	25000
2003				7145	3992	9811	20948	7121	2498	9641	19260	25000
2004				6991	3674	9391	20057	6974	1913	9078	17965	25000
2005				7175	4669	10403	22248	7140	2852	9962	19954	25000
2006				8256	5496	11186	24937	8219	3611	10684	22515	25000
2007				6500	4534	10194	21228	6470	3006	9467	18944	25000
2008				5683	3700	8871	18253	5638	2419	8092	16149	25000
2009				4581	3183	7723	15487	4502	1879	6844	13225	25000
2010				5183	3529	7503	16216	5142	2149	6743	14034	25000
2011				4999	3669	7345	16013	4957	2525	6764	14246	25000
2012				5187	3505	6898	15589	5136	2180	6454	13771	25000
2013				4870	3414	6835	15119	4837	2149	6450	13436	25000
2014												25000
2015												25000
2016												25000
2017												25000
2018												25000
2019												25000
2020												25000
2021												25000
2022												25000
2023												25000
2024												25000
2025												25000

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.55			0.80		
1994	0.48			0.80		
1995	0.44			0.80		
1996	0.42			0.80		
1997	0.70			0.80		
1998	0.73			0.80		
1999	0.51			0.80		
2000	0.78			0.80		
2001	0.40			0.80		
2002	0.68			0.80		
2003	0.47			0.80		
2004	0.90			0.80		
2005	0.90			0.80		
2006	0.40			0.80		
2007	0.40			0.80		
2008	0.44			0.80		
2009	0.90			0.80		
2010	0.76			0.80		
2011	0.60			0.80		
2012	0.65			0.80		
2013	0.65			0.80		
2014	0.65					
2015	0.65					
2016	0.65					
2017	0.65					
2018	0.65					
2019	0.65					
2020	0.65					
2021	0.65					
2022	0.65					
2023	0.65					
2024	0.65					
2025	0.65					

Parameters:	Optim cells
Adult Survival =	0.800
Initial Total Male Pop/10,000 =	0.400
Initial Female Pop/10,000 =	1.585

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Classification Counts				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		66.65	2.08	25.22	25.22	1.11	77	2436	1811	4324	40.1	11.2
1994		61.92	2.07	26.71	26.71	1.20	47	2094	1184	3325	37.6	8.3
1995		62.45	2.13	27.04	27.04	1.24	60	1597	828	2485	33.9	6.7
1996		65.26	2.34	22.26	22.26	1.18	21	1796	556	2373	44.1	5.1
1997		65.79	2.79	22.55	22.55	1.40	10	1107	172	1289	34.2	1.8
1998		67.93	2.47	24.23	24.23	1.27	13	1549	106	1668	39.9	1.1
1999		71.74	3.15	25.28	25.28	1.60	7	1735	114	1856	40.7	1.1
2000		58.31	2.11	21.81	21.81	1.13	8	1738	162	1908	45.2	1.7
2001		63.05	2.75	26.64	27.13	1.59	22	1313	275	1610	33.8	2.8
2002		66.27	2.56	23.96	23.65	1.32	48	1190	243	1481	36.4	2.7
2003		73.86	2.74	25.91	25.90	1.38	22	1359	154	1535	37.4	1.7
2004		76.82	3.58	21.08	20.25	1.52	16	1601	285	1902	47.9	3.3
2005		71.67	3.23	28.63	29.52	1.80	32	1652	401	2085	38.9	4.2
2006		76.93	3.44	33.80	34.78	2.02	33	1713	456	2202	34.3	4.5
2007		68.35	3.44	31.75	34.74	2.19	27	1389	661	2077	33.7	7.1
2008		69.67	3.03	29.90	28.07	1.67	41	1164	708	1913	34.6	8.8
2009		65.78	3.01	27.45	26.66	1.67	72	1186	799	2057	41.0	11.4
2010		76.25	3.50	31.87	32.94	2.00	38	1255	691	1984	39.1	10.1
2011		73.28	3.63	37.32	37.32	2.31	38	1040	528	1606	31.2	7.9
2012		79.57	4.37	33.78	33.78	2.46	46	1204	403	1653	37.8	6.4
2013		75.00	3.62	33.32	32.50	2.08	30	1150	350	1530	37.1	5.6
2014												
2015												
2016												
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2018												
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2020												
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2023												
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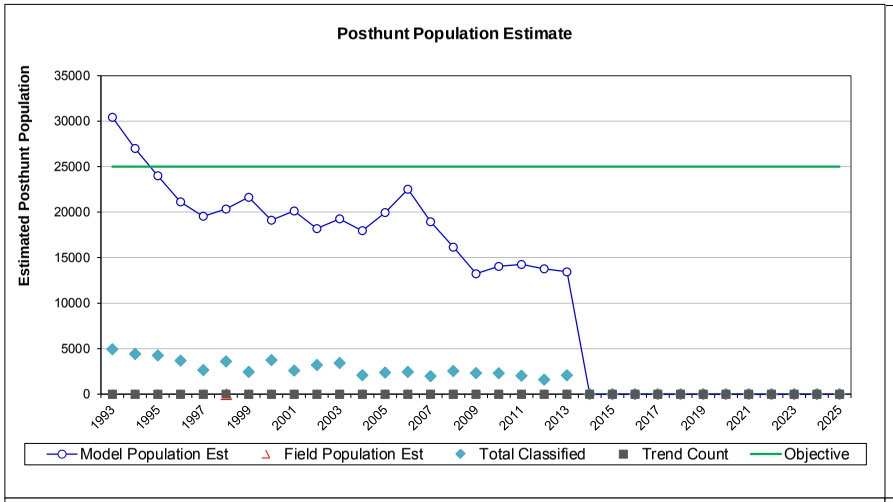
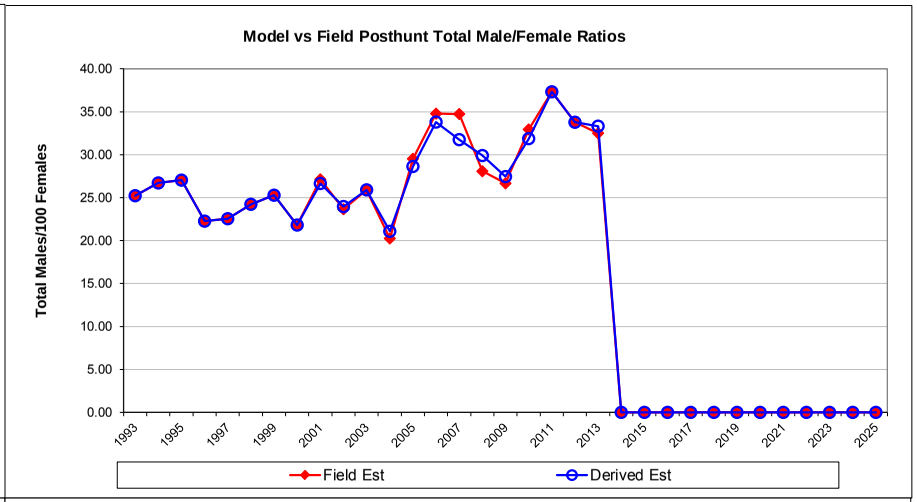
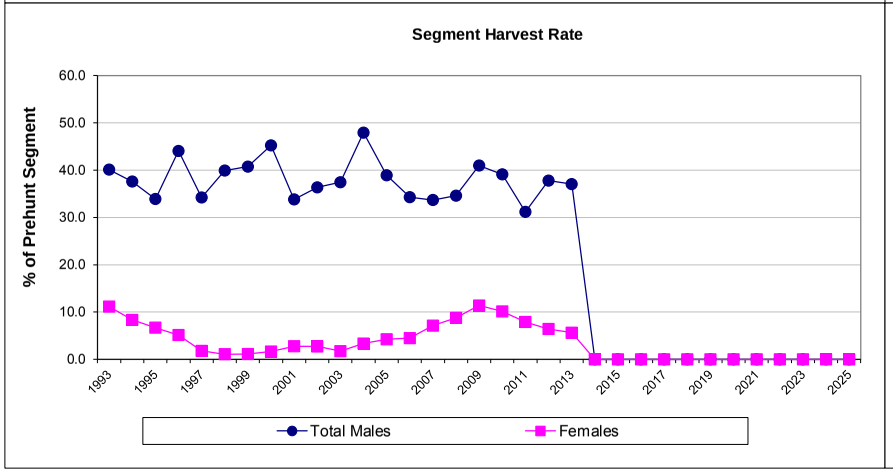
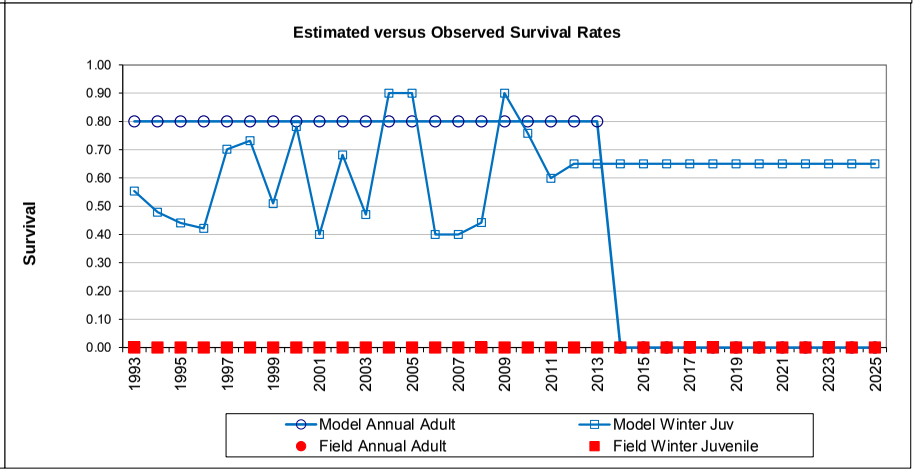
FIGURES









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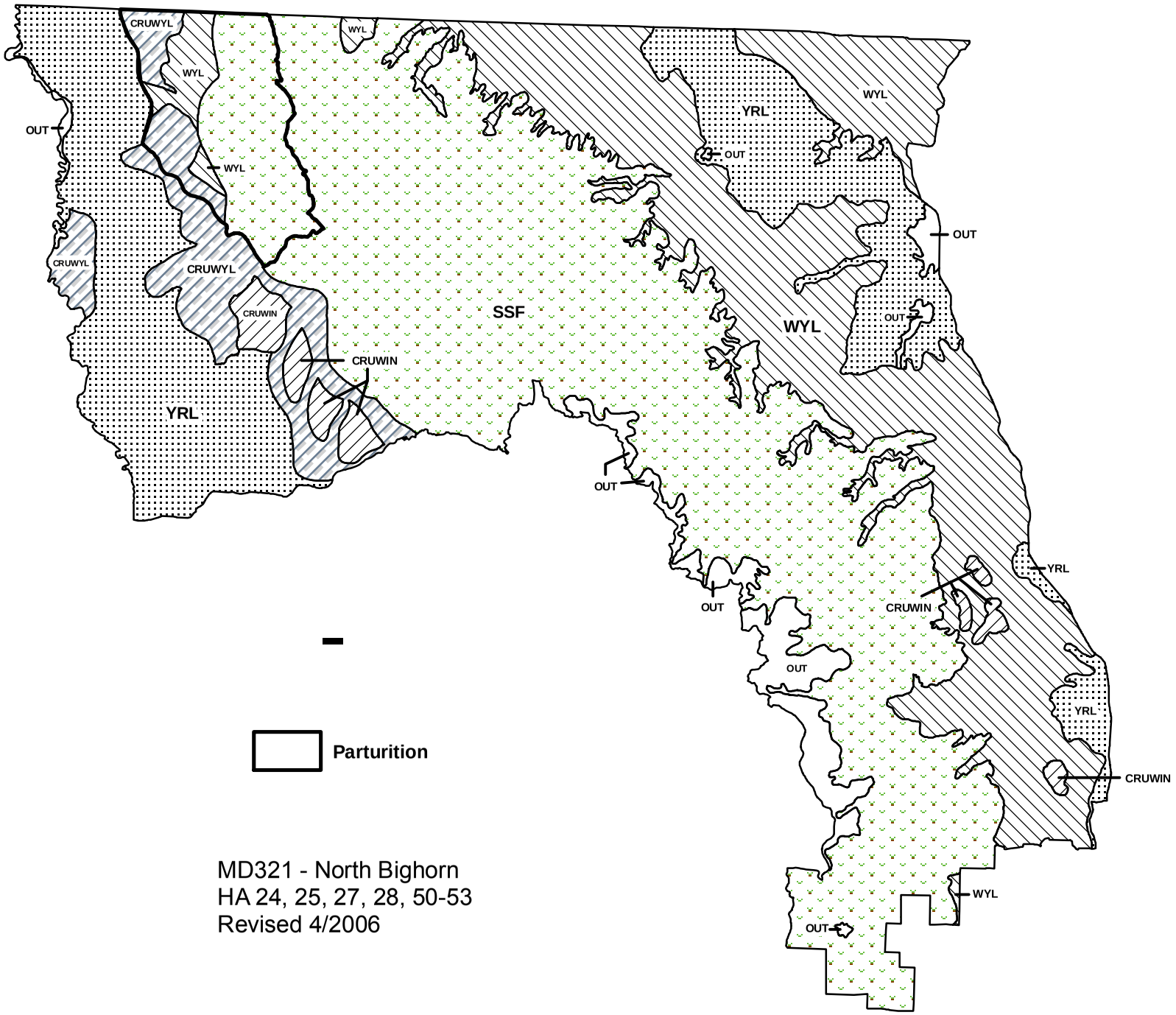


MD321 - North Bighorn
HA 24, 25, 27, 28, 50-53
Revised 4/2006

2012 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2012 - 5/31/2013

HERD: MD322 - UPPER POWDER RIVER

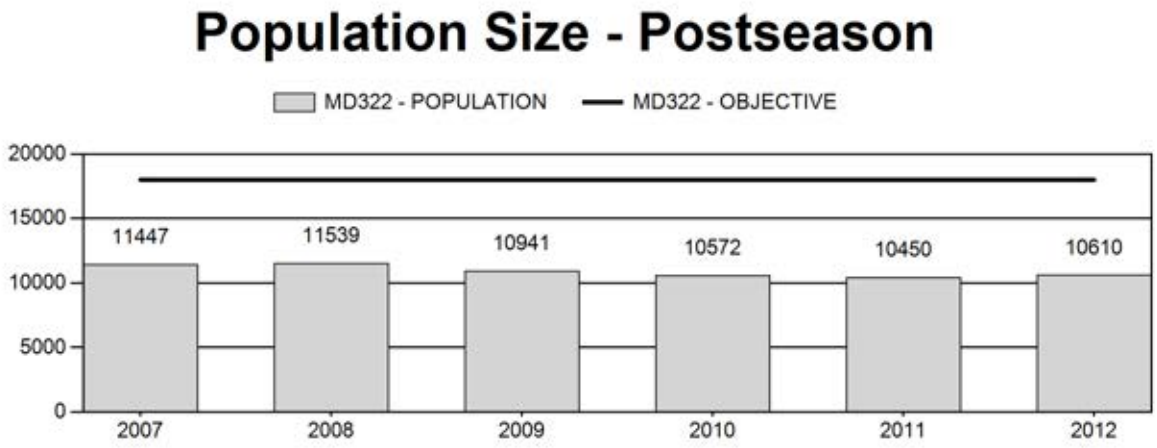
HUNT AREAS: 30, 32-33, 163, 169
PREPARED BY: DAN THIELE

	2007 - 2011 Average	2012	2013 Proposed
Population:	10,990	10,610	10,185
Harvest:	1,060	905	860
Hunters:	1,631	1,487	1,500
Hunter Success:	65%	61%	57%
Active Licenses:	1,746	1,487	1,500
Active License Percent:	61%	61%	57%
Recreation Days:	6,716	6,379	6,000
Days Per Animal:	6.3	7.0	7.0
Males per 100 Females	35	36	
Juveniles per 100 Females	62	74	

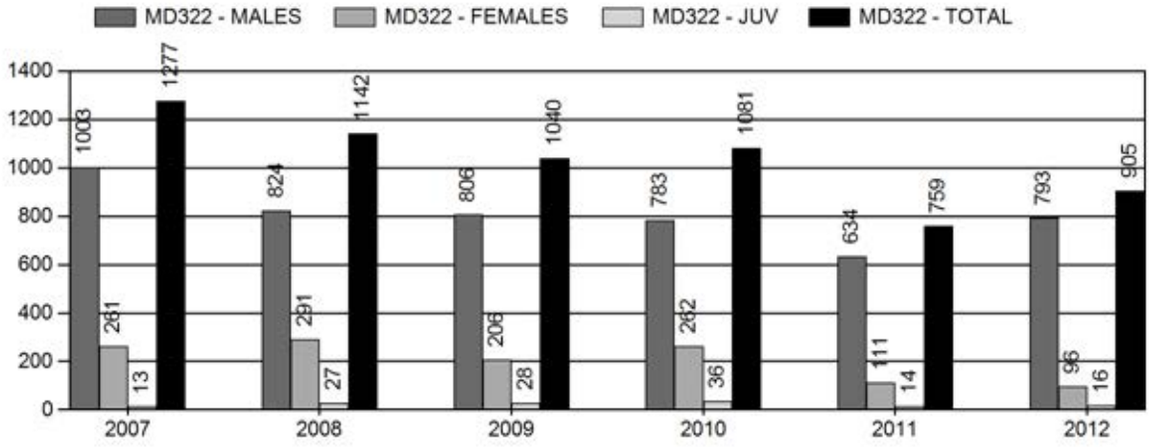
Population Objective:	18,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-41.1%
Number of years population has been + or - objective in recent trend:	10
Model Date:	5/23/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

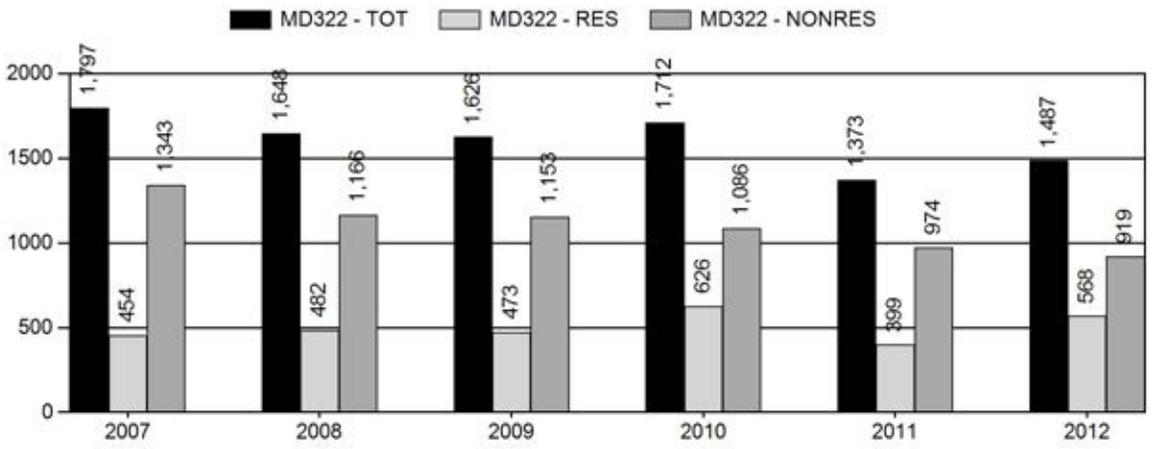
	JCR Year	Proposed
Females ≥ 1 year old:	1%	2%
Males ≥ 1 year old:	21%	31%
Juveniles (< 1 year old):	0%	0%
Total:	6%	8%
Proposed change in post-season population:	+7%	-4%



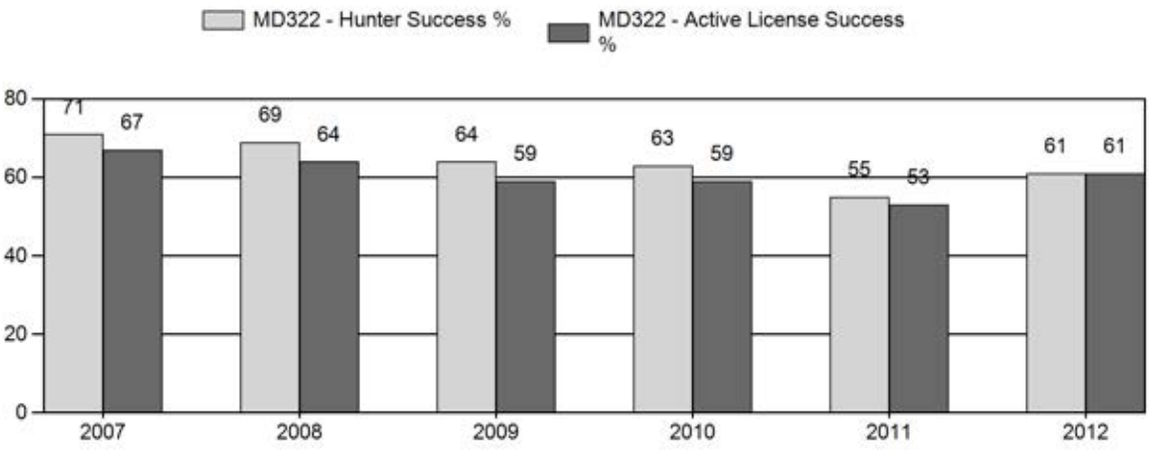
Harvest



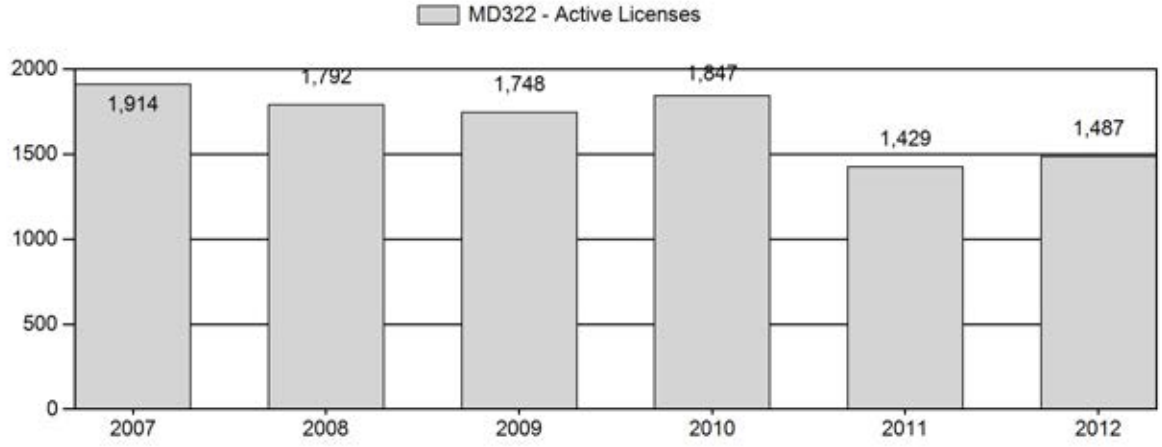
Number of Hunters



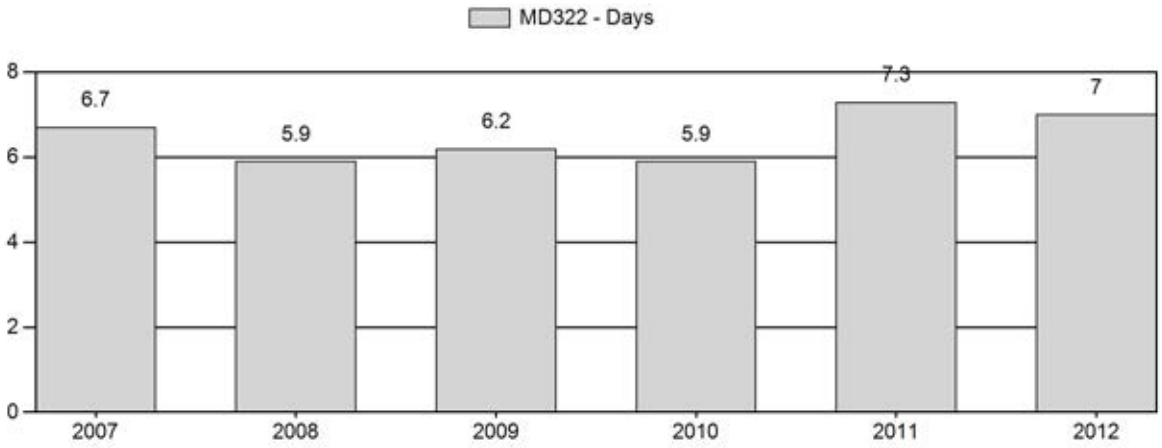
Harvest Success



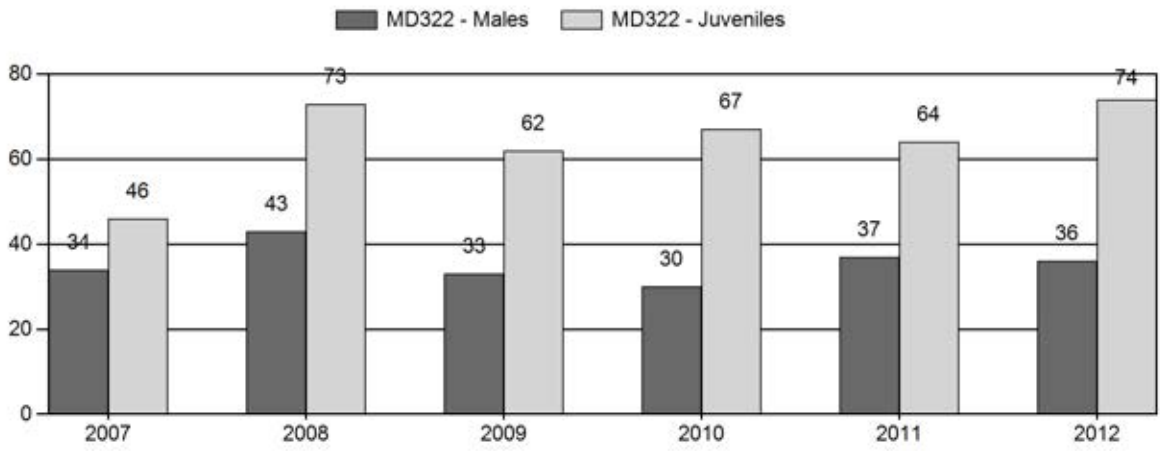
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Mule Deer Herd MD322 - UPPER POWDER RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	11,447	83	282	365	19%	1,067	56%	487	25%	1,919	747	8	26	34	± 2	46	± 3	34
2008	11,539	117	248	365	20%	847	46%	616	34%	1,828	1,604	14	29	43	± 3	73	± 5	51
2009	10,941	127	165	292	17%	880	51%	542	32%	1,714	1,170	14	19	33	± 3	62	± 4	46
2010	10,572	115	196	311	15%	1,047	51%	697	34%	2,055	1,279	11	19	30	± 2	67	± 4	51
2011	10,450	138	246	384	18%	1,049	50%	675	32%	2,108	1,218	13	23	37	± 3	64	± 4	47
2012	10,600	134	188	322	17%	897	48%	662	35%	1,881	1,522	15	21	36	± 3	74	± 4	54

2013 HUNTING SEASONS
UPPER POWDER RIVER MULE DEER HERD (MD322)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
30		Oct. 15	Oct. 31		General license, any deer
32		Oct. 15	Oct. 31		General license, any deer
33		Oct. 15	Oct. 31		General license, any deer
	6	Oct. 15	Dec. 15	50	Limited quota licenses; doe or fawn deer valid on private land
163, 169		Oct. 15	Oct. 21		General license, any deer
Archery		Sept. 1	Sept. 30		Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2012
33	6	+50
Herd Unit Total	**6**	**+50**

Management Evaluation
Current Postseason Population Management Objective: 18,000
Management Strategy: Recreational
2012 Postseason Population Estimate: ~10,600
2013 Proposed Postseason Population Estimate: ~10,200

Herd Unit Issues

The Upper Powder River Mule Deer Herd Unit has a post-season population objective of 18,000 deer. The management strategy is recreational management. The objective and management strategy were last revised in 1991 but are being reviewed in 2013.

This herd unit has excellent deer habitat extending from sagebrush grasslands in the east to mountain grasslands and mixed conifer habitats to the west. In the last 5 to 10 years, white-tailed deer numbers have greatly increased creating potential competition issues with mule deer in riparian areas and associated cropland. Accessible public lands are limited in the north but more prevalent to the south with accessible public lands receiving heavy hunting pressure. Areas 163 and 169 contain relatively large areas of accessible public lands and are managed with more conservative hunting seasons. Outfitted and trespass fee hunting of private lands limit hunter access. Nonresidents comprise the majority of the hunters in this herd unit.

Another factor influencing this population is mortality attributed to mountain lion predation. Most mountain lion habitat and harvest in mountain lion Hunt Area 15 corresponds to this deer herd unit. Area 15 lion harvest reached a record high 31 lions in 2008-09. The 2010-11 harvest

was 29 lions while the 2011-12 harvest was 30 lions and the current hunting season harvest was 16 lions as of May 30, 2013.

Weather

Weather in the area turned extremely warm and dry after several good moisture years. The Palmer drought index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "very moist" conditions for January 2012 but progressed to "extreme drought" by January 2013. The National Weather Service in Sheridan reported 2012 as the driest year since 1960 and the fourth driest year in 105 years with 9.53 inches of precipitation (14.16" ave). It was also the sixth warmest year on record with an average temperature of 48.1° F, the warmest year since 2006. Winter 2012-13 conditions were mild so above average mortality was not observed.

Habitat

There is one Wyoming big sagebrush habitat transect and one curl-leaf mountain mahogany transect in this herd unit. Utilization during the 2011-12 winter was very light (less than 5% of leaders browsed) due to low mule deer numbers. Sagebrush production measured in September 2012 averaged 8 mm per leader compared to 33 mm per leader in 2011. Mountain mahogany production averaged 21 mm per leader in 2012 compared to 25 mm per leader in 2011.

Field Data

Classifications completed following the hunting season resulting in herd ratios of 74 fawns:100 does and 36 bucks:100 does. Fawn ratios have trended up over the last six years but have failed to generate a noticeable increase in deer numbers. Buck ratios remain solid with ratios of $\geq$30:100 in all six years. High ratios are influenced by conservative hunting strategies on private land. Hunters were generally satisfied with their hunting experience as 73% responded positively to the satisfaction survey.

Harvest Data

The 2012 harvest survey reported a slight increase in harvest and hunter success. However, the six year harvest trend is decreasing with a nearly 30% decrease in total harvest and 20% decrease in buck harvest since 2007. Likewise, active license numbers continue to decrease with a >20% decrease since 2007. Hunter success has decreased 10% over the period while hunter effort has trended up. These data suggest fewer deer and tougher hunting conditions, even with fewer hunters. The postseason landowner survey reflects these trends with an increasing percentage of landowners reporting deer numbers below desired levels. In 2012, 62% of responding landowners wanted more deer while 32% were satisfied with the population. Only two landowners wanted fewer deer. No doe/fawn licenses were available in 2012. The Region Y quota sold out, however, 270 licenses remained after the draw.

Population

This population is estimated at 10,600 mule deer, about 40% below the population objective. The estimate was generated with the newly adopted EXCEL spreadsheet model. No independent population estimates have been collected. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it has a slightly higher AIC value (76 vs. 71). This model selected fawn survival estimates within the range of parameters while the CJ/CA model selected the lowest survival rates allowed. The model indicates this population has decreased since 1999 including a 10%

decrease from 2007 through 2011. A slight increase occurred in 2012 due to a higher fawn ratio. Widely fluctuating buck ratios from 2004 through 2011 likely complicate modeling efforts. Therefore, this model is considered a fair model. The EXCEL spreadsheet model results mimic the old POP-II model.

Management Summary

Seasons have been adjusted to minimize antlerless harvest in recent years. The nonresident Region Y license quota was reduced 9% in 2012 to 2,000 licenses. The postseason buck ratio remains adequate but is influenced by private land areas that are hunted more conservatively.

An Area 33 Type 6 season was reinstated in 2013 to address depredation concerns. No change was made to the Region Y license quota (2,000 licenses). A 2013 population of 10,200 deer is predicted.

INPUT	
Species:	Mule Deer
Biologist:	Dan Thiele
Herd Unit & No.:	Upper Powder River
Model date:	05/23/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	62	71	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	64	76	☑ SCJ,SCA	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	8	115	☐ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				6078	4300	12504	22883	6051	2614	11487	20151	18000
1994				4916	3568	10546	19030	4853	2476	9886	17215	18000
1995				5286	3592	9419	18296	5246	2535	9090	16870	18000
1996				6539	3771	8926	19236	6449	2682	8722	17853	18000
1997				6452	4295	9045	19791	6443	2980	8785	18208	18000
1998				6470	4527	9092	20089	6450	3445	8861	18756	18000
1999				6221	4895	9154	20270	6208	3420	8890	18518	18000
2000				4705	4793	9095	18593	4676	3071	8895	16642	18000
2001				3844	3999	8579	16423	3812	2824	8361	14996	18000
2002				4431	3512	7867	15810	4390	2399	7649	14438	18000
2003				5178	3375	7503	16056	5165	2387	7267	14819	18000
2004				4262	3627	7465	15355	4206	2520	7250	13975	18000
2005				4841	3407	7127	15374	4778	2519	6889	14186	18000
2006				3751	3600	7037	14388	3725	2685	6745	13155	18000
2007				2880	3374	6567	12821	2866	2271	6280	11416	18000
2008				4095	2757	5909	12761	4065	1850	5589	11505	18000
2009				3447	2833	5773	12053	3416	1946	5546	10909	18000
2010				3522	2688	5519	11730	3482	1827	5231	10540	18000
2011				3343	2617	5294	11254	3328	1919	5172	10419	18000
2012				3774	2637	5195	11606	3756	1765	5089	10610	18000
2013				3196	2661	5275	11131	3185	1836	5165	10185	18000
2014												18000
2015												18000
2016												18000
2017												18000
2018												18000
2019												18000
2020												18000
2021												18000
2022												18000
2023												18000
2024												18000
2025												18000

Survival and Initial Population Estimates

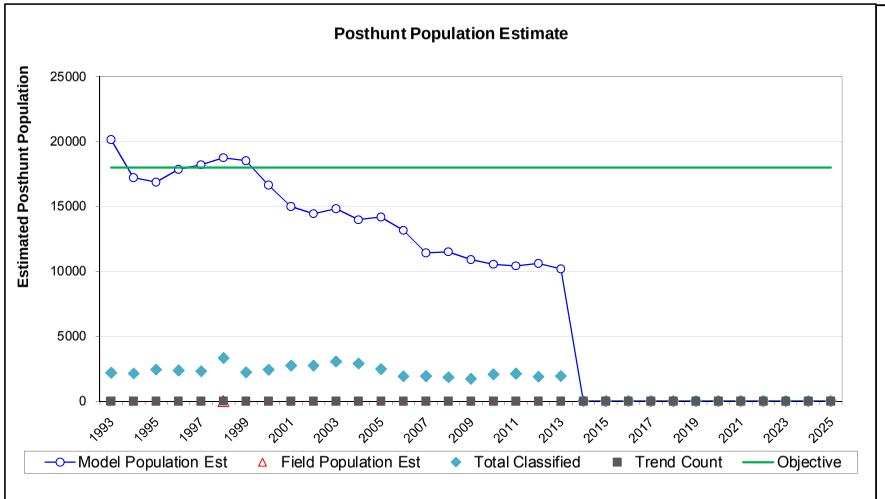
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.50			0.79		
1994	0.68			0.79		
1995	0.68			0.79		
1996	0.68			0.79		
1997	0.68			0.79		
1998	0.68			0.79		
1999	0.68			0.79		
2000	0.68			0.79		
2001	0.68			0.79		
2002	0.68			0.79		
2003	0.68			0.79		
2004	0.68			0.79		
2005	0.68			0.79		
2006	0.68			0.79		
2007	0.68			0.79		
2008	0.68			0.79		
2009	0.68			0.79		
2010	0.68			0.79		
2011	0.68			0.79		
2012	0.68			0.79		
2013	0.68			0.79		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

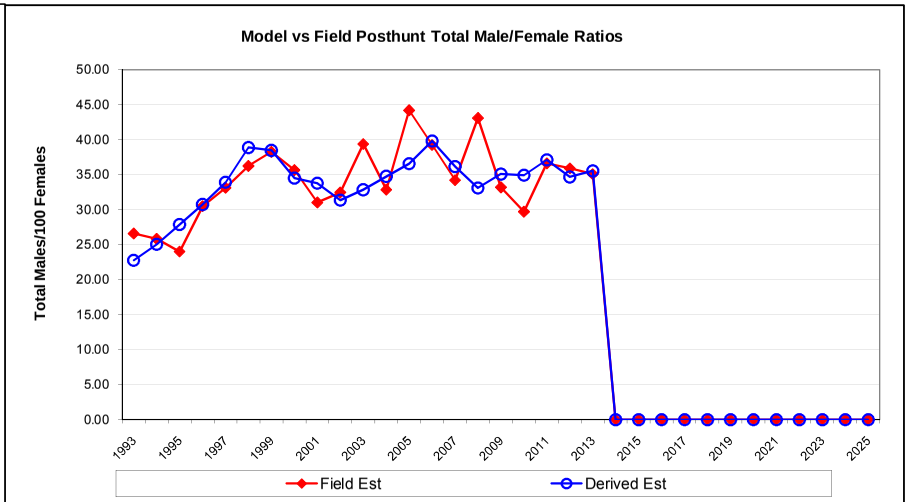
Parameters:	Optim cells
Juvenile Survival =	0.678
Adult Survival =	0.786
Initial Total Male Pop/10,000 =	0.261
Initial Female Pop/10,000 =	1.149

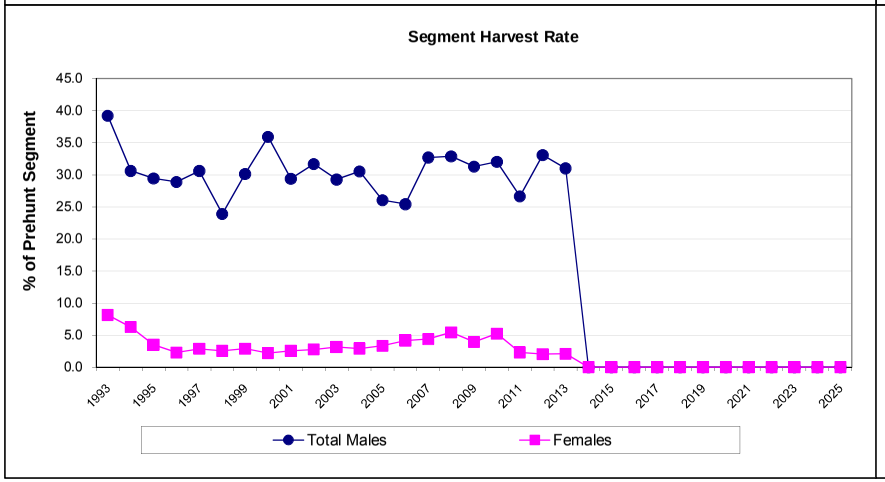
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

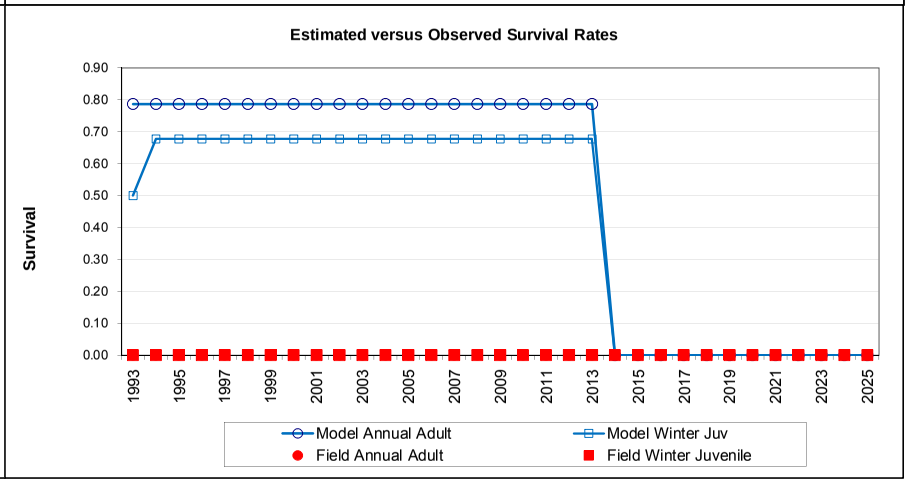
Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		52.67	2.57	22.76	26.58	1.66	25	1533	925	2483	39.2	8.1
1994		49.09	2.46	25.05	25.83	1.64	57	993	600	1650	30.6	6.3
1995		57.71	2.62	27.88	24.00	1.50	36	961	299	1296	29.4	3.5
1996		73.94	3.34	30.75	30.50	1.86	82	990	185	1257	28.9	2.3
1997		73.34	3.38	33.92	33.12	1.99	8	1195	236	1439	30.6	2.9
1998		72.79	2.82	38.88	36.24	1.77	18	984	210	1212	23.9	2.5
1999		69.83	3.34	38.47	38.25	2.23	12	1341	240	1593	30.1	2.9
2000		52.57	2.50	34.52	35.65	1.94	26	1566	182	1774	35.9	2.2
2001		45.60	2.07	33.77	31.02	1.62	29	1069	199	1297	29.4	2.6
2002		57.40	2.51	31.37	32.45	1.73	37	1012	198	1247	31.7	2.8
2003		71.07	2.90	32.84	39.38	1.95	12	898	214	1124	29.3	3.1
2004		58.01	2.46	34.75	32.85	1.70	51	1007	196	1254	30.5	2.9
2005		69.36	3.19	36.57	44.18	2.35	57	807	216	1080	26.1	3.3
2006		55.23	2.96	39.81	39.24	2.37	24	832	265	1121	25.4	4.1
2007		45.64	2.50	36.16	34.21	2.07	13	1003	261	1277	32.7	4.4
2008		72.73	3.85	33.11	43.09	2.70	27	824	291	1142	32.9	5.4
2009		61.59	3.36	35.09	33.18	2.24	28	806	206	1040	31.3	3.9
2010		66.57	3.25	34.92	29.70	1.92	36	783	262	1081	32.0	5.2
2011		64.35	3.18	37.11	36.61	2.18	14	634	111	759	26.7	2.3
2012		73.80	3.78	34.68	35.90	2.33	16	793	96	905	33.1	2.0
2013		61.66	3.19	35.54	35.07	2.20	10	750	100	860	31.0	2.1
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES



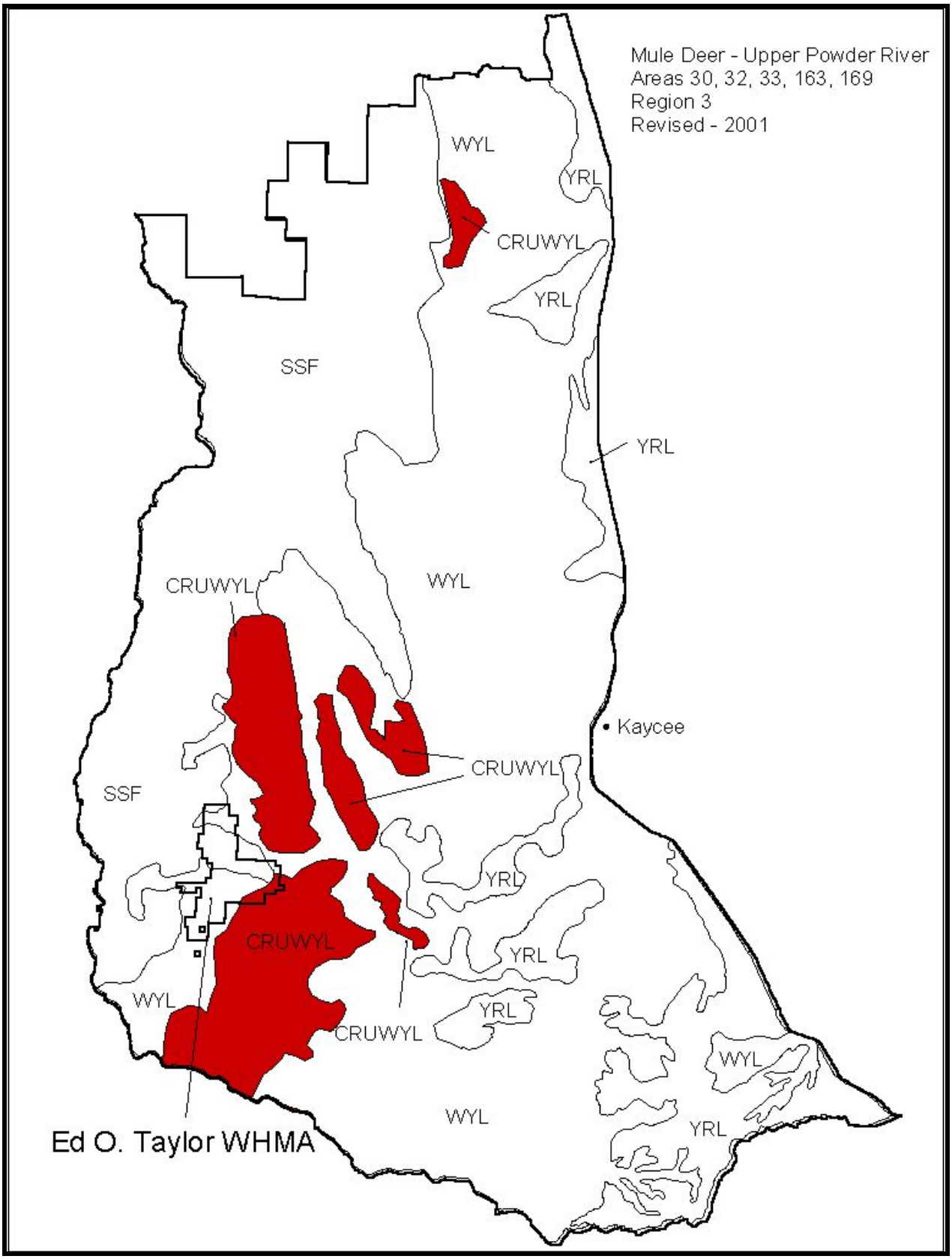






Comments:

END


Mule Deer - Upper Powder River
Areas 30, 32, 33, 163, 169
Region 3
Revised - 2001
WYL
YRL
CRUWYL
YRL
SSF
YRL
CRUWYL
WYL
Kaycee
CRUWYL
SSF
YRL
CRUWYL
YRL
WYL
YRL
CRUWYL
WYL
YRL
Ed O. Taylor WHMA